Foundation Certificate in Green IT Syllabus

Version 3.0

March 2011

Certificate in Green IT Syllabus

Contents

Change History

Version Number and Date of Change	Changes Made
Version 3.0 March 2011	Updated terminology and added new content in Section 2 and removed Section 2.9.
Version 2.5 March 2010	Added 'dematerialisation' to Section 2.5 of the syllabus.
Version 2.4 January 2010	Added more detailed syllabus heading timings.
Version 2.3 November 2009	Added Format of examination to end of syllabus.

Introduction

Environmental concerns and climate change have been the starting point for organisations to focus on creating sustainable business practices. This is now being underpinned by international treaties and local regulations. However, every organisation has a more fundamental reason to embrace Green IT.

Put simply, Green IT means reduced energy and resource consumption resulting in reduced costs. Unlike some other Green initiatives, Green IT should lead directly to bottom line benefits for an organisation.

The BCS Foundation Certificate in Green IT provides an entry level qualification for anyone who is involved in creating sustainable, energy efficient IT systems or exploiting the role of IT in helping deliver sustainable, more efficient business practices to other areas of the organisation.

The course is aimed at anyone involved or interested in Green IT as we as those within IT with relevant experience who wants to gain knowledge in this area or understand where their role fits in the wider environment of Green IT.

Although designed for IT professionals, this qualification is ideal for other non-IT professionals who require a basic understanding of the subject area – such as Managers for Corporate Sustainability, and Procurement.

Aims and Objectives

The BCS Foundation Course in Green IT provides an entry-level introduction across the broad range of issues associated with use of information and communications technology (ICT) to achieve sustainable ICT operations and business practices. Candidates should be able to demonstrate their knowledge and understanding of the concepts, issues, techniques and challenges in delivering Green IT. Key areas include:

- The wider background to Green IT
- Establishing a Green IT Policy
- Establishing a Green IT Action Plan
- Concepts and techniques for internal assessment
- The risks and benefits of Green IT
- The techniques and technologies available to enable Green IT
- The role of Green IT across the organisation
- The roles and responsibilities of key stakeholders

Please note: The subject area covered in this syllabus is constantly changing, especially national and international laws and regulations. As a result, it is essential that both trainers and candidates keep themselves up to date.

Eligibility for the Examination

There are no specific requirements for entry to the BCS Green IT examination however candidates should possess basic IT skills and an appropriate level of knowledge and experience to fulfil the objectives shown above.

It is recommended that all candidates attend an approved training course run by an accredited Training Provider.

The purpose of the Foundation Certificate in 'Green IT' is to certify that the candidate has gained knowledge of terminology, an understanding of key concepts and has comprehended the best practice principles of 'Green IT'.

Format of the Examination

This syllabus has an accompanying examination at which the candidate must achieve a pass score to gain the BCS Certificate in Green IT.

The format of the examination is a one hour multiple choice exam consisting of forty questions. The examination is closed book. A correct answer to 26/40 is required to pass the examination.

Candidates who are awarded a pass for the examination are will receive the BCS Foundation Certificate in Green IT.

Notice to Training Providers

Each major subject heading in the syllabus is assigned an allocated time. The purpose of this is to give both guidance on the relative proportion of time to be allocated to each section of an accredited course and an approximate minimum time for the teaching of each section. Training Providers may spend more time than is indicated and candidates may spend more time again in reading and research.

The total time specified in this syllabus is a minimum of 18 hours of lecture and practical work normally delivered over three days.

The course may be delivered as a series of modules with gaps between them, as long as it meets accreditation requirements. For guidance on what is required, please contact the Accreditation Team.

The course is aimed at anyone involved or interested in Green IT as we as those within IT with relevant experience who wants to gain knowledge in this area or understand where their role fits in the wider environment of Green IT.

The Syllabus

1.   What is Green IT? An Overview (4 hrs)*

1.1. Understand the overall need for an organisation to adopt a Green IT strategy. (30 minutes)

- The reality of climate change and over-population
- A brief understanding of climate change science
- Consumption of precious resources such as oil, gas and water
- The effect of poor and unsustainable working practices
- The effect of hazardous waste use and disposal

1.2. Provide an understanding of the historic development and context of the Kyoto Protocol. (30 minutes)

- The Kyoto Protocol – and historic background
- The formation of the International Panel on Climate Change
- The Rio Earth Summit
- The UN Framework Convention on Climate Change and IPCC
- Further rounds of COP (Copenhagen, Cancun, etc.)

1.3   Understand the definition of 'Green IT'. (30 minutes)

- The key elements of Green IT
- Commonly accepted definitions
- IT as an energy consumer
- IT as a green 'enabler'
- The concept and dangers of 'Green Wash'

1.4. Identify and understand an organisation's external drivers and opportunities for greening its IT. (30 minutes)

- Political drivers
- Environmental drivers
- Social drivers
- Legal drivers
- Economic drivers

1.5   Identify and understand the internal drivers, opportunities and benefits of adopting a Green IT strategy for both an organisation and its IT service provider(s). (30 minutes)

- Cost
- Operations
- Marketing/PR
- Culture

1.6.   Understand the main goals of government legislation and voluntary initiatives pertaining to Green IT. Only international contexts will be examined but an overview must be given of legislation, standards and initiatives that is pertinent to a candidate's local region. (60 minutes). An additional 30 minutes is recommended for non examinable sections.

International standards and initiatives

Including:

- ISO14000 series (energy measurement)
- Energy Star
- EPEAT
- UN ITU

International voluntary initiatives

Including:

- PUE/DCiE (From The Green Grid)
- SMART 2020 (From The Climate Group)
- WRI

European standards/initiatives (Will not form part of the final examination)

Including:

- Directive on Restriction of Hazardous Substances (RoHS)
- EU Eco Design of Energy Using Products (EuP) Directive
- EU Eco-labelling legislation
- EU ETS and CCA
- EU WEEE directive
- EU Voluntary Codes of Conduct for Data Centre Energy Efficiency, Broadband services, and external power supplies
- ECMA (European Computer Manufacture Association) green criteria for IT products
- Blue Angel green criteria for IT products

UK legislation/standards/initiatives (Will not form part of the final examination)

Including:

- BSI PAS 2050(product/service lifecycle foot-printing) & 2060 (carbon neutrality)
- UK Climate Change Bill
- UK Energy Bill
- UK Carbon Reduction Commitment Energy Efficiency Scheme
- Energy Performance of Buildings Directive and UK Regulations
- Batteries and Accumulators Directive
- UK government green IT strategy and best practices
- UK Government Buying Standards(GBS)

US/North American legislation (Will not form part of the final examination)

Including:

- American Clean Energy and Securities Acts
- Clean, Low-emissions, Affordable New Transportation Efficiency Act
- US Mayors Climate Protection Agreement
- Other relevant State legislation

Australian legislation (Will not form part of the final examination)

Including:

- Carbon Pollution Reduction Scheme
- Mandatory Renewable Energy Target
- The Hazardous Waste Act
- Other relevant State legislation

2. Internal assessment of your organisation: where are we now? (11hrs)*

2.1. Gain an understanding of how to create an Green IT policy. (60 minutes)

- The role of a Green IT policy
- The importance of a Green IT policy
- The alignment of Green IT policy with an organisation's environmental, sustainability and Corporate Social Responsibility policies
- How to overcome the dangers of 'Green Wash'

2.2. Know how to assess an organisation's business operations; in terms of their carbon footprint. (90 minutes)

- Definition of carbon footprints: direct and indirect emissions
- Examples of an organisation's footprints: direct and indirect emissions
- An understanding of carbon emissions across a product/service lifecycle including:
    1. Concept & design
    2. Material extraction
    3. Transport
    4. Manufacture
    5. Usage
    6. Disposal
- Carbon Footprint Calculators
- Carbon Offsetting and Carbon Neutrality
- Carbon trading

2.3. Understand the contribution that emissions from the use of IT is making to those carbon footprints in terms of energy consumption and behaviours. (90 minutes)

- PCs and mobile devices
- Office applications and equipment
- Communication and collaboration technologies
- Servers
- Data storage
- Data centres

2.4. Describe how to audit an organisation's existing IT functions and processes. (60 minutes)

- Identification of energy and carbon inefficiencies
- Planning and prioritising green IT initiatives
- Establishing a continuous improvement framework for Green ICT including use of the ITIL Continual Service Improvement Model
- Tools and methods available
- Roles and responsibilities

2.5. Understand the importance and risks, issues and opportunities around improving efficiency. (120 minutes)
- Printing and recycling
- Desktop kit (monitors, processors, external devices)
- Mobile and remote communications
- Server Rooms and Data Centres
- Including approaches for:
- Assessing environmental and property impacts eg heating/cooling
- Device consolidation
- Different approaches to CPU, server and data storage optimisation
- Thin clients
- Virtualisation eg servers, disk tiering
- Dematerialisation – from assets to services
- Cloud computing/Software as a Service (SaaS)
- Power provisioning and management

2.6. Understand the concept of total systems lifecycle management that supports IT assets from manufacture to disposal and its carbon impact. (90 minutes):

- The supply chain for IT products and services
- The impact of suppliers and customers
- Procuring for Green IT, including:
    1. Supplier selection criteria
    2. Working with suppliers
    3. Tools and methods available such as Suppliers and Contracts database
    4. The benefits
- Providing efficient, low carbon support and maintenance, including:
    1. Service desk
    2. Change management
    3. Service Asset and Configuration Management
    4. Training

2.7. Understand how best to re-use, recycle and dispose of IT assets. (30 minutes)

- The impact of equipment refresh cycles
- Different approaches to product disposal
- Tools and approaches available
- The benefits of re-use, recycle and dispose

2.8. Developing a Green IT Action Plan. (120 minutes)

- The scope
- Timelining and budgeting
- Roles and responsibilities
- Tools and methods
- Monitoring and measurement
- The benefits
- Employee engagement and management
- Stakeholder identification, engagement and management

3. Deployment of ICT for sustainability across your organisation's activities (3hrs)*

3.1. Understand how to embed the use of ICT for reducing emissions from business activities, in an IT Strategy for Sustainability. (60 minutes)

The role of IT in:
- their business units
- product/service delivery
- achieving wider business goals
- investments to achieve carbon reductions
- achieving carbon neutrality

3.2. Discuss the roles and responsibilities associated with Green IT and IT for sustainable operations. (30 minutes)

- The Green IT Champion
- Procurement Manager
- Sustainability Officer
- Corporate Social Responsibility (CSR) Manager

3.3. Explain how to encompass Green IT and IT for sustainable operations in end-to-end lifecycle costing, business cases and TCO. (90 minutes)

- New accounting practices, to include 'social' accounting methods such as Triple Bottom Line
- Definition and calculation of end-to-end lifecycle costs
- Definition and calculation of payback periods
- Definition and calculation of Total Cost of Ownership
- Tools and methods available

*Note: the timings show the relative weightings for each area of the syllabus.

These weightings reflect the approximate percentage of examination questions which will be devoted to this topic.

Additional Information

Levels of Skill and Responsibility (SFIA 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 1: Follow

Work under close supervision to perform routine activities in a structured environment. They will require assistance in resolving unexpected problems, but will be able to demonstrate an organised approach to work and learn new skills and applies newly acquired knowledge.

Level 2: Assist

Works under routine supervision and uses minor discretion in resolving problems or enquiries. Works without frequent reference to others and may have influence within their own domain. They are able to perform a range of varied work activities in a variety of structured environments and can identify and negotiate their own development opportunities. They can also monitor their own work within short time horizons and absorb technical information when it is presented systematically and apply it effectively.

Level 3: Apply

Works under general supervision and uses discretion in identifying and resolving complex problems and assignments. They usually require specific instructions with their work being reviewed at frequent milestones, but can determines when issues should be escalated to a higher level. Interacts with and influences department/project team members. In a predictable and structured environment they may supervise others. They can perform a broad range of work, sometimes complex and non-routine, in a variety of environments. They understand and use appropriate methods, tools and applications and can demonstrate an analytical and systematic approach to problem solving. They can take the initiative in identifying and negotiating appropriate development opportunities and demonstrate effective communication skills, sometimes planning, scheduling and monitoring their own work. They can absorb and apply technical information, works to required standards and understand and uses appropriate methods, tools and applications.

Level 4: Enable

Works under general direction within clear framework of accountability and can exercise substantial personal responsibility and autonomy. They can plan their own work to meet given objectives and processes and can influence their team and specialist peers internally. They can have some responsibility for the work of others and for the allocation of resources. They can make decisions which influence the success of projects and team objectives and perform a broad range of complex technical or professional work activities, in a variety of contexts. They are capable of selecting appropriately from applicable standards, methods, tools and applications and demonstrate an analytical and systematic approach to problem solving, communicating fluently orally and in writing, and can present complex technical information to both technical and non-technical audiences. They plan, schedule and monitor their work to meet time and quality targets and in accordance with relevant legislation and procedures, rapidly absorbing new technical information and applying it effectively. They have a good appreciation of the wider field of information systems, their use in relevant employment areas and how they relate to the business activities of the employer or client.

Level 5: Ensure and advise

Works under broad direction, being fully accountable for their own technical work and/or project/supervisory responsibilities, receiving assignments in the form of objectives. Their work is often self-initiated and they can establish their own milestones, team objectives, and candidates responsibilities. They have significant responsibility for the work of others and for the allocation of resources, making decisions which impact on the success of assigned projects i.e. results, deadlines and budget. They can also develop business relationships with customers, perform a challenging range and variety of complex technical or professional work activities and undertake work which requires the application of fundamental principles in a wide and often unpredictable range of contexts. They can advise on the available standards, methods, tools and applications relevant to own specialism and can make correct choices from alternatives. They can also analyse, diagnose, design, plan, execute and evaluate work to time, cost and quality targets, communicating effectively, formally and informally, with colleagues, subordinates and customers. They can demonstrate leadership, mentor more junior colleagues and take the initiative in keeping their skills up to date. Takes customer requirements into account and demonstrates creativity and innovation in applying solutions for the benefit of the customer.

Level 6: Initiate and influence

Have a defined authority and responsibility for a significant area of work, including technical, financial and quality aspects. They can establish organisational objectives and candidates responsibilities, being accountable for actions and decisions taken by them self and their subordinates. They can influence policy formation within their own specialism to business objectives, influencing a significant part of their own organisation and customers/suppliers and the industry at senior management level. They make decisions which impact the work of employing organisations, achievement of organisational objectives and financial performance, developing high-level relationships with customers, suppliers and industry leaders. They can perform highly complex work activities covering technical, financial and quality aspects. They contribute to the formulation of IT strategy, creatively applying a wide range of technical and/or management principles. They absorb complex technical information and communicate effectively at all levels to both technical and non-technical audiences, assesses and evaluates risk and understand the implications of new technologies. They demonstrate clear leadership and the ability to influence and persuade others, with a broad understanding of all aspects of IT and deep understanding of their own specialism(s). They take the initiative in keeping both their own and subordinates' skills up to date and to maintain an awareness of developments in the IT industry.

Level 7: Set strategy, inspire and mobilise

Have the authority and responsibility for all aspects of a significant area of work, including policy formation and application. They are fully accountable for actions taken and decisions made, by both them self and their subordinates. They make decisions critical to organisational success and influence developments within the IT industry at the highest levels, advancing the knowledge and/or exploitation of IT within one or more organisations. They develop long-term strategic relationships with customers and industry leaders, leading on the formulation and application of strategy. They apply the highest level of management and leadership skills, having a deep understanding of the IT industry and the implications of emerging technologies for the wider business environment. They have a full range of strategic management and leadership skills and can understand, explain and present complex technical ideas to both technical and non-technical audiences at all levels up to the highest in a persuasive and convincing manner. They have a broad and deep IT knowledge coupled with equivalent knowledge of the activities of those businesses and other organisations that use and exploit IT. Communicates the potential impact of emerging technologies on organisations and individuals and analyses the risks of using or not using such technologies. They also assess the impact of legislation, and actively promote compliance.

Levels of Knowledge (K Levels)

The following levels of knowledge shall be defined and applied for syllabus creation. Each topic in the syllabus shall be examined according to the learning objectives defined in the section devoted to that topic. Each learning objective has a level of knowledge (K level) associated with it and this K level by association defines the nature of any examination questions related to that topic.

Note that each K level subsumes lower levels. For example, a K4 level topic is one for which a candidate must be able to analyse a situation and extract relevant information. A question on a K4 topic could be at any level up to and including K4. As an example, a scenario requiring a candidate to analyse a scenario and select the best risk identification method would be at K4, but questions could also be asked about this topic at K3 and a question at K3 for this topic might require a candidate to apply one of the risk identification methods to a situation.

Level 1: Remember (K1)

The candidate should be able to recognise, remember and recall a term or concept but not necessarily be able to use or explain. Typical questions would use: define, duplicate, list, memorise, recall, repeat, reproduce, state.

Level 2: Understand (K2)

The candidate should be able to explain a topic or classify information or make comparisons. The candidate should be able to explain ideas or concepts. Typical questions would use: classify, describe, discuss, explain, identify, locate, recognise, report, select, translate, paraphrase.

Level 3: Apply (K3)

The candidate should be able apply a topic in a practical setting. The candidate should be able to use the information in a new way. Typical questions would use: choose, demonstrate, employ, illustrate, interpret, operate, schedule, sketch, solve, use, write.

Level 4: Analyse (K4)

The candidate should be able to distinguish/separate information related to a concept or technique into its constituent parts for better understanding, and can distinguish between facts and inferences. Typical questions would use: appraise, compare, contrast, criticise, differentiate, discriminate, distinguish, examiner, question, test.

Level 5: Synthesise (K5)

The candidate should be able to justify a decision and can identify and build patterns in facts and information related to a concept or technique, they can create new meaning or structure from parts of a concept. Typical questions would use: appraise, argue, defend, judge, select, support, value, evaluate.

Level 6: Evaluate (K6)

The candidate should be able to provide a new point of view and can judge the value of information and decide on its applicability in a given situation. Typical questions would use: assemble, contract, create, design, develop, formulate, write.

Learning objectives are given indicators from K1-K6. These are based on Bloom's taxonomy of knowledge in the cognitive domain (ref Taxonomy of Educational Objectives, Handbook 1 – The Cognitive Domain, Bloom et al., New York 1956), and can be broadly interpreted as follows: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyse; K5 – Synthesise; K6 – Evaluate. Bloom's taxonomy is explained in greater detail in Section 5.1. All topics shall have learning objectives associated with them, each of which has an associated K level. The language used must, as far as possible, mirror the language used in defining Bloom's taxonomy to provide candidates with consistent pointers to the expected level of knowledge and a consistent way of expressing that level in words.

This course will provide candidates with the levels of knowledge highlighted within the following table, enabling them to develop the skills to operate at the levels of responsibility indicated. The levels of knowledge, skill and responsibility are explained in the following text:

Level	Levels of knowledge	Levels of skill and responsibility
7		Set strategy, inspire and mobilise
6	Evaluate	Initiate and influence
5	Synthesise	Ensure and advise
4	Analyse	Enable
3	Apply	Apply
2	Understand	Assist
1	Remember	Follow

Trainer Qualification Criteria

Criteria:	Trainers must hold the BCS Certificate in Green IT Foundation with a minimum of 80% pass rate.

Class Room Size

Trainer to candidate ratio:	1:16

Format of the Examination

Type	40 Question Multiple Choice
Duration	1 Hour
Pre-requisites	Accredited training is strongly recommended but is not a pre-requisite
Supervised / Invigilated	Yes
Open Book	No
Pass Mark	26/40
Distinction Mark	None
Delivery	Paper based examination or on-line via Prometric.