Certified Tester

Expert Level

Modules Overview

Version 1.2, 23rd August 2013

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International Software Testing Qualifications Board

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Expert Level Working Group: Graham Bath, Rex Black, Marcel Kwakernaak, Judy McKay, Andrew Pollner, Randall Rice, Erik van Veenendaal, 2010

Revision History

Version	Date	Remarks
0.1	November 16th 2010	Initial version for review
0.2	January 1st 2011	Review comments incorporated
1.0	March 11th 2011	Released at Prague GA
1.1	April 12th 2013	Released at Toronto GA • Updates resulting from decision to divide ITP and TM syllabi into parts • Additional text for BO TM3 to improve mapping to LOs • Revised Bos for Test Automation • Additional section for security testing
1.2	August 23rd 2013	Released at Helsinki GA Addition explanation regarding certification(section 1.6)

Acknowledgements

1. **Introduction**

1.1 Intended audience

This overview document is intended for anyone with an interest in the ISTQB Expert Level who wants a high-level introduction to its leading principles and an overview of the individual Expert Level modules.

Business owners and managers in human resources departments will particularly benefit from the description of business outcomes for the subjects covered at Expert Level.

1.2 The Testing Expert

Before going into the ISTQB Expert Level, we should define what it means to be a testing expert.

The testing expert:

An expert is a person with the special skills and knowledge representing mastery of a particular testing subject. Being an expert means possessing and displaying special skills and knowledge derived from training and experience.

A testing expert is one that has a broad understanding of testing in general, and an in depth understanding in a specific test area. An in depth understanding means sufficient knowledge of testing theory and practice to be able to influence the direction that an organization and/or project takes when creating, implementing and executing testing activities related to the specific area.

It is important to emphasize that an expert must embody both knowledge and the necessary skills to apply that knowledge in real-life situations.

It is expected that in the future possessing an ISTQB Expert Level certificate will also allow those experts to use the Certified Tester Expert Level (CTEL) acronym.

1.3 Modular structure of the Expert Level

There is a common understanding that an expert is often an expert in only a certain area of testing. This requires an ISTQB multi-module Expert Level.

The Expert Level follows a testing-based structure for the modules, e.g. test management, test automation, test process improvement.

As with the Advanced Level, the Expert Level defines separate syllabi for each module. Each syllabus is supported by clear business outcomes and learning objectives.

In this document each Expert Level module is described with the following information:

Module content:

The syllabus content for each module (and its constituent parts) is described in summary form. The individual learning objectives and their allocation to a particular syllabus part is described.

Business outcomes:

These provide an overview and statement of what can be expected from an expert in the particular subject area, (e.g. an expert test manager), and will particularly benefit businesses who are considering the development of specific Expert Level skills.

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1.4 Other relevant documents

Please note that the Rules and Recommendations relating to the Expert Level are described in a separate document [ISTQB-EL-Rules-and-Recs].

Section 4.2 lists the documents referred to in this overview.

1.5 Expert Level syllabi and their parts

The following Expert Level modules are either released or being developed:
- Improving the testing process
- Test management
- Test automation
- Security testing

The following subjects are currently considered as potential candidates for future development (in alphabetic order):
- Performance testing
- Static testing
- System integration
- Test design techniques
- Usability testing

Other subjects may be developed as the need arises. Additional sections will be added to this overview document as further modules become defined.

Each Expert Level syllabus is divided into parts, with each part being examined separately. Training courses may cover an entire syllabus or an individual part.

The syllabi and parts are defined in the following table:

Module/Syllabus	Part	Required Advanced Level Certificate	Course duration (days)
Improving the testing process	1. Assessing test processes	Test Manager	5
	2. Implementing test process improvement	Test Manager	4
Test management	1. Strategic Test Management	Test Manager	3
	2. Operational Test Management	Test Manager	4
	3. Managing the Test Team	Test Manager	4
Test automation	1. Test automation management	Test Manager	3
	2. Test automation engineering	Technical Test Analyst	4
Security testing	(not divided into parts)	Technical Test Analyst	5

The following diagram shows the overall Certified Tester syllabus structure with the Expert Level modules and their individual parts (abbreviated names are used).
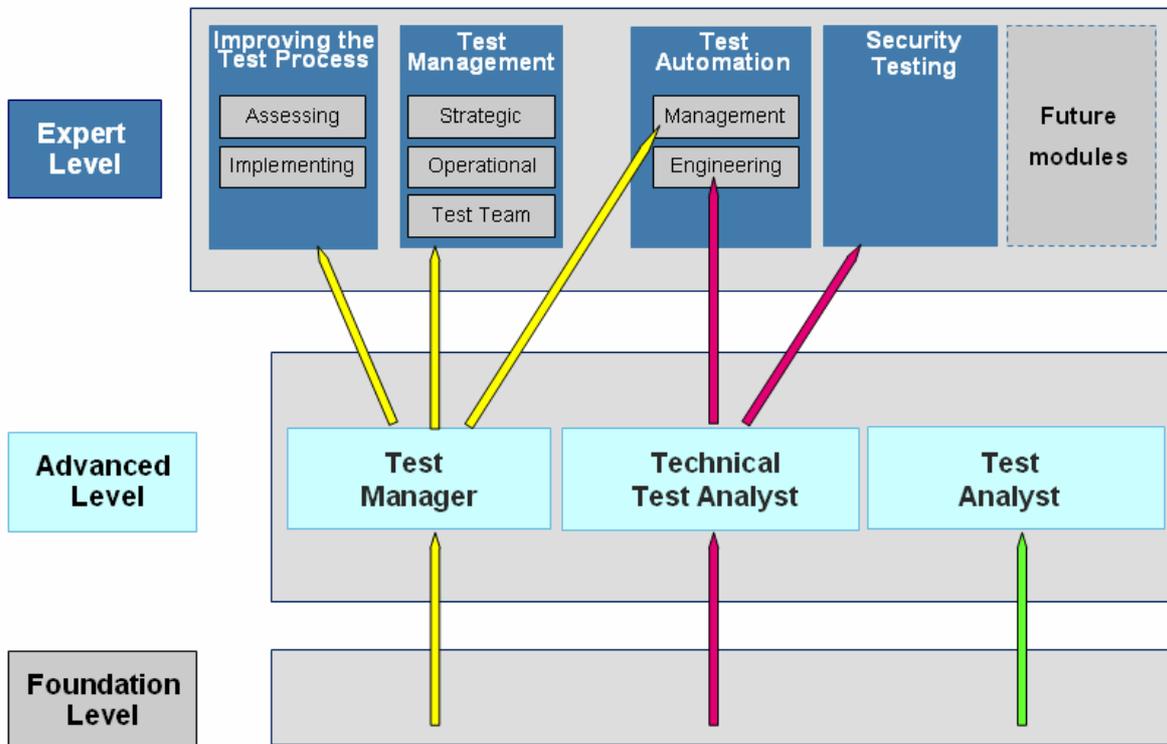
The diagram shows required certifications and the career paths currently available. These will be developed as more Expert Level modules are added.

1.6 Expert Level Certification

Achieving the Expert Level certification requires that experience is gained and appropriate exams are passed.

Experience required

- At least 5 years of practical testing experience, and
- At least 2 years of industry experience in the specific Expert Level topic

Exams which must be passed:

- To become "Expert in Improving the Test Process", a candidate must pass the exams for Part 1. "Assessing test processes" and Part 2 "Implementing test process improvement".

- To become "Expert in Test Management", a candidate must pass the exams for Part 1. "Strategic Test Management, Part 2 "Operational Test Management" and Part 3: "Managing the Test Team".

- To become "Expert in Test Automation Management", a candidate must pass the "Test Automation: Management" exam.

- To become "Expert in Test Automation Engineering", a candidate must pass the "Test Automation: Engineering" exam.

- To become "Expert in Security Testing", a candidate must pass the "Security Testing" exam.

2. .Overview of Expert Level Modules

2.1 Module: Improving the Test Process

2.1.1 Content

The syllabus [ISTQB-ITP-Syllabus] starts with an introduction to the fundamental issues concerning improvement to the test process. Basic questions like "why improve testing?" and "what can be improved?" are considered and the different ways that stakeholder can view quality are described.

There are a number of different approaches which can be applied to improving the test process; overviews of these approaches are provided.

Model-based improvement is considered in depth by first examining fundamental aspects of using models and then describing and comparing a number of well known test improvement models.

Analytical approaches to improving the test process, such as causal analysis, are covered in as much detail as the model-based approaches. Metrics play a significant role in analytical approaches so a number of these are covered, together with an approach to using metrics effectively e.g., the GQM-approach.

An expert in this field will be expected to select the right approach for a given situation. The factors to consider are covered and the relative benefits of each approach are compared.

The task of improving test processes is itself a process which can be described in several steps, including the setting of scope and objectives for improvement, assessing the current situation, analyzing results, performing solution analysis, suggesting improvements and priorities, creating an improvement plan, implementing the plan and gaining knowledge from each improvement cycle. The syllabus details each of these steps according to a standard process definition.

Different organization forms for implementing improvements to the test process are covered, including the impact of offshoring on those organizations. The typical roles to be found in these organizations are described and the wide range of different skills required for effectively performing those roles are detailed.

Management of change is essential in rolling out improvements to the test process into projects and organizations. In particular, the human factors in the change management process are covered in the syllabus. A wide range of different skills is covered including those needed for effective interviewing and for performing analysis.

The syllabus concludes with a detailed consideration of critical success factors.

2.1.2 Parts

The Expert Level Improving the Test Process syllabus consists of the following parts:

Part	Name	Principal focus
1	Assessing the test process	• Different approaches to test process improvement • Assessing test processes using models • Analytical approaches to test process assessment • Creating improvement recommendations
2	Implementing test process improvement	• Creating and implementing a test improvement plan • Organizing the test process improvement effort (roles, organizational forms) • Required skills • Managing change

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2.1.3 Business Outcomes

The expert test process improver is able to perform each of the following tasks:

Part 1: Assessing test processes

TP1.1   Lead programs for improving the test process within an organization or project and can identify and manage critical success factors

TP2   Take appropriate business-driven decisions on how to approach improvement to the test process

TP3   Assess the current status of a test process, propose step-wise improvements and show how these are linked to achieving business goals

TP5   Analyze specific problems with the test process and propose effective solutions

Part 2: Implementing test process improvement

TP1.2   Lead programs for implementing test process improvements within an organization or project and can identify and manage critical success factors

TP4   Set up a strategic policy for improving the test process and implement that policy

TP6   Create a test improvement plan which meets business objectives

TP7   Develop organizational concepts for improvement of the test process which include required roles, skills and organizational structure

TP8   Establish a standard process for implementing improvement to the test process within an organization

TP9   Manage the introduction of changes to the test process, including co-operation with the sponsors of improvements

TP10   Understand and effectively manage the human issues associated with assessing the test process and implementing necessary changes

2.1.4 Syllabus coverage of parts

The following tables show the chapters and sections of the Improving the Test Process syllabus which relate to the two parts.

Part 1: Assessing test processes

Chapter/Section	Title
2	The context of improvement
3	Model-based improvement
4	Analytical-based improvement
5	Selecting test process improvement approaches
6.2	Initiating the improvement process
6.3	Diagnosing the current situation

Part 2: Implementing test process improvement

Chapter/Section	Title
6.1	Process for improvement: Introduction
6.4	Establishing a test improvement plan
6.5	Acting to implement improvement
6.6	Learning from the improvement program
7	Organization, Roles and Skills
8	Managing change
9	Critical Success Factors
10	Adapting to different Life-Cycle models

2.2 Module: Test Management

2.2.1 Content

The syllabus [ISTQB-TM-Syllabus] starts by considering the purpose of testing or the test mission, and the relation between the test policy, the test strategy and the test objectives. The expert test manager is considered to be able to utilize and adapt all available methods to define and meet testing objectives. Furthermore, an expert test manager is expected to be able to design a specific method or approach to meet those objectives and to gain and maintain early management commitment.

Managing the test team and managing testing throughout the organization are addressed extensively and special attention is given to the various project management tasks that would apply at the expert test management level. The test managers' role in performing risk management (risk assessment workshops and risk mitigation management), reviews, assessments, quality gate evaluation, quality assurance and audits are covered in detail. How to report test results and how to interpret results by evaluation of exit criteria is elaborated upon. The metrics are described which are presented in an Key Performance Indicator (KPI) dashboard and play a crucial role in the management of the test process.

The expert test manager is expected to select or create, evaluate and improve the most appropriate approach for a given situation, which implies that several right approaches can occur simultaneously, of which no individual approach stands out significantly. It is up the expert test manager to find a suitable approach or combination of approaches which fit the organization in order to meet or exceed the given objectives.

Different ways to organize testing as well as different types of projects for test management, including vendor management, are covered. Typical test management topics such as incident management, test project evaluation and tools for reporting and test management are addressed in depth.

The syllabus concludes with an overview of special test management considerations for different domains and project factors.

2.2.2 Parts
The Expert Level Test Management syllabus consists of the following parts:

Part	Name	Principal focus
1	Strategic Test Management	• Establishing test management within the organization. • Test mission, test policy, test strategy, test objectives
2	Operational Test Management	• Optimal implementation of test management principles in an organization
3	Managing the Test Team	• Building and managing the most appropriate team of testing staff for an organization. • Locating, screening, hiring, developing skills

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2.2.3 Business Outcomes

The expert test manager is able to perform each of the following tasks:

Part 1: Strategic Test Management

TM2   Define organizational test policy, select and implement appropriate test strategies to meet business objectives and quality goals.

TM3   Unify and merge disparate test approaches and test management, and define and implement efficient and effective organization-wide strategies which consider different lifecycle models and project types.

TM6   Define a tool strategy for the testing organization, including migration, conversion, integration, training, efficiency and process modification.

Part 2: Operational Test Management

TM1   Position, represent and promote the testing organization and its role in the production of quality software.

TM4   Integrate information from multiple sources to determine realistic estimating and scheduling options to achieve a product with a given quality level.

TM5   Communicate effectively at any level in the organization regarding all aspects of software testing.

TM7   Determine the most effective testing process considering product, lifecycle, regulatory requirements, standards, organizational factors, schedules and budgets

TM10   Derive a metrics tracking and reporting scheme that will address the information needs of internal and external stakeholders.

Part 3: Managing the Test Team

TM1   Position, represent and promote the testing organization and its role in the production of quality software.

TM5   Communicate effectively at any level in the organization regarding all aspects of software testing.

TM8   Maximize efficiency by selecting the appropriate mix of personnel considering skill levels, staffing options, location of resources and management structure

TM9   Screen, hire, develop and manage a test team for maximum efficiency.

Note that different aspects of business outcomes TM1 and TM5 are addressed in part 2 and part 3.

2.2.4 Syllabus coverage of parts

The following tables show the chapters and sections of the Test Management syllabus parts.

Part 1: Strategic Test Management

Chapter/Section	Title
2.2	Mission, Policy, and Metrics of Success
2.3	Test Strategies
2.4	Alignment of Test Policy and Test Strategy with the Organization
4.6	Merging Test Strategies
5.7	Integrating Tools Across the Organization
6.4	Quality Management
8.1	Test Management Considerations for Lifecycle Models
8.2	Managing Partial Lifecycle Projects
9.3	Effectiveness, Efficiency and Satisfaction Metrics for the Test Policy Objectives

Part 1: Operational Test Management

Chapter/Section	Title
4.2	Types of External Relationships
4.3	Contractual Issues
4.4	Communication Strategies
4.5	Integrating from External Sources
4.7	Verifying Quality
5.5	Creating and Building Relationships
6.2	Project Management Tasks
6.3	Project Risk Management
7.2	Tracking Information
7.3	Evaluating and Using Information - Internal Reporting
7.4	Sharing Information - External Reporting
7.5	Test Results Reporting and Interpretation
7.6	Statistical Quality Control Techniques
8.3	Release Considerations
9.2	Effectiveness, Efficiency and Satisfaction Metrics for the Test Process
9.4	Project Retrospectives

Part 3: Managing the Test Team

Chapter/Section	Title
3.2	Building the Test Team
3.3	Developing the Test Team
3.4	Leading the Test Team
5.2	Advocating the Test Team
5.3	Placement of the Test Team
5.4	Stakeholder Communication
5.6	Advocating Quality Activities Across the Organization
5.8	Handling Ethical Issues

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2.3 Module: Test Automation

Pre-release note: The content in this section is provided for information and may be subject to change.

2.3.1 Content

The syllabus [ISTQB-TA-Syllabus] defines test automation, the scope covered, and objectives. There are a number of different tools and technologies available to assist test projects in managing, executing, and reporting testing. Basic questions like "why would you use automation?", "how would you use automation?", and "when would you use automation?" are addressed.

Strategies for successful implementation of automated testing tools are covered extensively beginning with an assessment and evaluation of economic benefit. Discussion of generic automated testing architectures and how they can aid in the development, deployment, and maintainability of automated scripts is covered along with specific planning activities surrounding implementation which affect staffing, tools, and schedule.

An expert in the field of test automation will have the understanding to know what tools should be applied during what phase of the testing lifecycle and which approach should be used to ensure a successful implementation for any given situation.

Tools covered in the Test Automation Module include, but are not limited to those used for functional testing, regression testing, and test management. Performance testing is covered briefly, as a future Expert Level Syllabus may be dedicated to Performance Testing exclusively. The analysis and recommendations are tool agnostic, as tools from different vendors have similar capability and complementary features.

Techniques, based on best practices including automation frameworks, are described to ensure the successful and efficient implementation of testing tools and the skills necessary to develop and maintain an automated test environment.

Secondary uses of test automation are also discussed. These include, but are not limited to: automated configuration management of test artifacts, automatic metrics gathering and test reporting, automated creation and management of test data sets, and automatic defect reporting.

The process of automating test scripts in order to create a sustainable regression test suite can be described in several steps. There are specific roles and responsibilities for test teams wishing to incorporate automation into the overall testing process including the detailed consideration of critical success factors.

2.3.2 Parts
The Expert Level Test Automation syllabus consists of the following parts:

Part	Name	Principal focus
1	Test Automation Management	• Establishing an automation strategy • Identifying risks and benefits • Evaluating goals and objectives • Creating an implementation plan
2	Test Automation Engineering	• Planning for automation • Understanding a generic automated test architecture • Creating a purpose-built architecture • Strategies for implementation • Automated reporting and metrics collection

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2.3.3 Business Outcomes

The test automation expert is able to perform each of the following tasks, as outlined across the Management and Engineering syllabi:

Syllabus I: Test Automation - Management

TA-M1 Develop a test automation policy and strategy appropriate for the organization

TA-M2 Create a business case which outlines the costs and benefits to be expected from introducing and sustaining test automation.

TA-M3 Develop a plan to integrate automated testing within the testing process

TA-M4 Oversee the evaluation of tools and technology for automation best fit to each project and organization

TA-M5 Manage the test automation resources to implement and sustain an effective test automation program

TA-M6 Define and gather metrics to effectively report progress of the test automation program

TA-M7 Apply findings to improve the test automation process

Syllabus II: Test Automation - Engineering

TA-E1 Contribute to the development of a plan to integrate automated testing within the testing process

TA-E2 Evaluate tools and technology for automation best fit to each project and organization

TA-E3 Create an approach and methodology for building a test automation architecture (TAA)

TA-E4 Design and develop (new or modified) test automation solutions that meet the business needs

TA-E5 Create automated test reporting and metrics collection

TA-E6 Manage and optimize testing assets to facilitate maintainability and address evolving (test) systems

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2.3.4 Syllabus coverage of parts

The following tables show the chapters and sections of the Test Automation syllabus which relate to the two parts.

Part 1: Test Automation Management

Chapter/Section	Title
2.2	Identifying Risks and Benefits of Test Automation
2.3	Strategic Considerations
2.4	Focusing the Automation Effort
3.2	Objectives and Goals
3.3	Planning the Effort
4.2	Succeeding at the Project Level
4.3	Controlling the Test Automation
4.4	Improving the Test Automation Process
5.0	Managing the Test Automation Team
5.2	Roles and Staffing
5.3	Training

Part 2: Test Automation Engineering

Chapter/Section	Title
1.	Introduction and Objectives for Test Automation
2.	Planning for Automation
3.	Generic Test Architecture
4.	Implementation Strategies
5.	Test automation reporting and metrics
6.	Transitioning manual testing to an automated environment
7.	Verifying the Test Automation Solution
8.	Continuous Improvement

2.4 Module: Security Testing

Pre-release note: The content in this section is provided for information and may be subject to change.

2.4.1 Content

The syllabus [ISTQB-ST-Syllabus] is designed to prepare people to effectively design and perform security tests that mitigate security risks for specific system and organization needs. A lifecycle approach to security testing is reinforced by describing security test activities at each stage of a project.

The broad objective of security testing is to test and evaluate the effectiveness of security protocols in preventing security attacks. For example, the presence and strength of encryption is within the scope of this syllabus, but the testing of the encryption algorithm is beyond the scope of the syllabus.

This syllabus addresses the available types of security test tools and how to understand the tool needs for an organization so that an informed evaluation can be performed.

Human factors are a major element of security risks and testing, so specific treatment of these factors is also covered in the syllabus.

Finally, security standards are examined since they form an important basis of security risk mitigation and security testing.

The current syllabus outline (9th February 2013) is shown in the table below.

Chapter	Section
Security Test Purposes, Goals and Strategies	The Purpose of Security Testing
	The Organizational Context
	Security Testing Objectives
	The Impact of Security Testing
	Security Testing Strategies
	Improvement of Security Testing Practices
	Alignment of Security Testing
	Advocating Security Testing
The Scope of Security Testing	Security Risks
	Understanding Stakeholder Needs In The Security Testing Processes
Security Testing Processes	Security Test Process Definition
	Security Test Planning
	Security Test Design
	Security Test Execution

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The current security testing syllabus outline (9th February 2013), continued:

Chapter	Section
Testing Security Protocols	Authentication
	Encryption
	Firewalls
	Intrusion Detection
	Virus Scanning
	Data Obfuscation
	Information Security Policies and Procedures
Security Life Cycle Phases	Understanding the Security Development Lifecycle
	The Role of Security Testing in Early Development Activities
	The Role of Security Testing in Implementation Activities
	The Role of Security Testing in Verification Activities
Human Factors in Security Testing	Understanding the Attackers
	Social Engineering
	Ethical Hacking
Security Test Evaluation and Reporting	Security Test Evaluation
	Security Test Reporting
	Designing a Security Test Dashboard
	Security Test Analysis and Reporting
Security Testing Tools	Types and Purposes of Security Testing Tools
	Tool Selection
	Tool Implementation
	Tool Maintenance and Support
Standards and Industry Trends	Security Standards
	Security Testing Standards
	Industry Trends

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2.4.2 Business Outcomes

The expert security tester is able to perform each of the following tasks:

ST1 Lead the security test planning and security test design within an organization, project or program to identify and manage security risks and to comply with organizational security policies

ST2 Assess the current status of security risks and design security tests and preventative steps to mitigate identified security risks throughout the project lifecycle

ST3 Evaluate the effectiveness of existing internal controls, security protocols and security tests

ST4 Align project and organizational security tests with the appropriate security policies and security risks

ST5 Integrate security test activities to support the information assurance processes in an organization

ST6 Design and perform security tests for a particular technology and system context, such as mobile computing, safety critical systems and financial systems

ST7 Define requirements and evaluation criteria for appropriate security test tools in a given project and organizational context

ST8 Set up a strategic policy for security testing, and implement that policy in an organization

ST9 Create a security test plan that integrates with a master test plan

ST10 Develop innovative concepts for security testing that include required roles, skills, methodologies and tools.

ST10 Establish appropriate procedural controls to mitigate system security risks at the business process level

ST10 Understand and apply relevant security standards to the security testing processes in an organization

ST10 Understand and effectively manage the human issues associated with security testing

3. **Abbreviations**

Abbreviation	Meaning
GQM	Goal-Question-Metric
ISTQB	International Software Testing Qualifications Board
LO	Learning Objective

4. References

4.1 Trademarks

The following registered trademarks and service marks are used in this document:

ISTQB® is a registered trademark of the International Software Testing Qualifications Board

4.2 Documents and Web-Sites

Identifier	Reference
[ISTQB-EL-Rules-and-Recs]	ISTQB Expert Level Rules and Recommendations, Version 1.0,11th March 2011
[ISTQB-ITP-Syllabus]	ISTQB Expert Level Syllabus: Improving the Test Process, Version 1.0.2, 16th April 2010. Available from [ISTQB-Web]
[ISTQB-ST-Syllabus]	ISTQB Expert Level Syllabus: Security Testing. Currently under development.
[ISTQB-TM-Syllabus]	ISTQB Expert Level Syllabus: Test Management, Version 1.0., 1st November 2011. Available from [ISTQB-Web]
[ISTQB-TA-Syllabus]	ISTQB Expert Level Syllabus: Test Automation. Currently under development.
[ISTQB-Web]	Web site of the International Software Testing Qualifications Board. Refer to this website for the latest ISTQB Glossary and syllabi. (www.istqb.org)