

# The new improved ISTQB® Advanced Level Certification Program

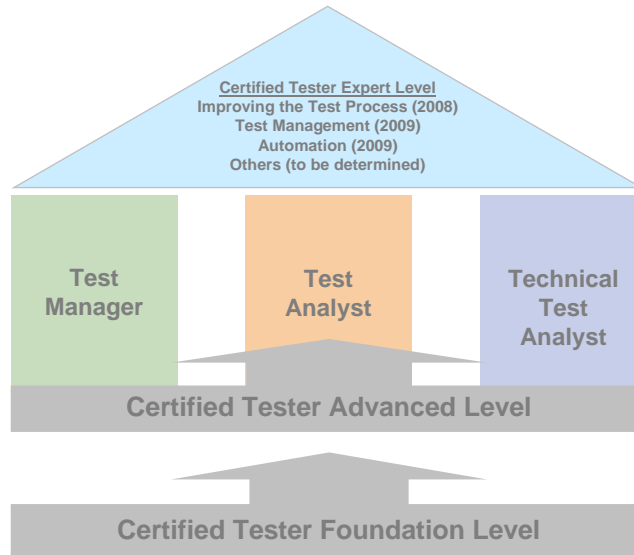
Presented by:  
Graham Bath (German Testing Board)  
Advanced Level WP

**SQC, Düsseldorf, April, 14th, 2008**

**Customised by the UK Testing Board  
for distribution within the UK**

## Contents

- ⇒ **Introduction**
- ⇒ Why do we need a new syllabus?
- ⇒ Main improvements
- ⇒ The way forward



### Exam Style

- Each module is separately examined
- All exams are multiple-choice format

### Prerequisites

- ISTQB Foundation Level certification
- Two years of practical experience

### Recognition

- All Advanced Level certificates against the "old" syllabus are further valid

### Roll-out

- Old/new will run in parallel for 6 months to prevent any disruption to current training plans

## Contents



- ➔ Background & strategy ISTQB®
- ➔ **Why do we need a new syllabus?**
- ➔ Main improvements
- ➔ The way forward

## We need to meet market expectations



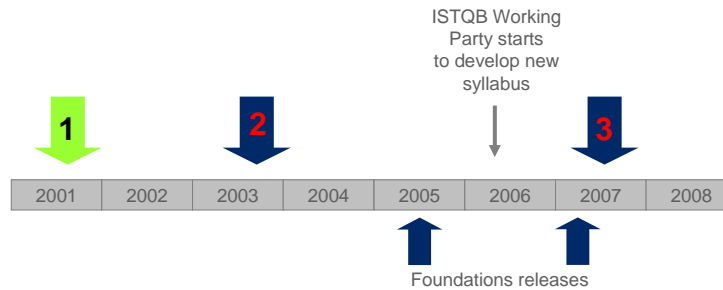
- ➔ The numbers of certified testers at foundations level have increased dramatically.
- ➔ Currently
  - Over 76,178 foundations
  - Nearly 5,677 advanced
- ➔ There is demand from the market for a world-wide standard at advanced level.
  - From individuals seeking to improve themselves
  - From employers (especially global players)

## Four years is a long time in IT



### Releases of the advanced syllabus

1. ISEB V1.1 September 2001
2. ISTQB V1.2E September 2003
3. ISTQB V2007 October 2007



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## Where we needed to improve



- We need more practical content
- Some specific topics need to be included
- We need a syllabus which does not implicitly require lots of reference books
- Less overlap with foundations syllabus
- Consistency with foundations (e.g. terms, test process)
- Content of individual advanced modules need to be more explicit
- Learning objectives more clearly defined
- Uphold the name "Advanced"

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## How the new syllabus was developed



- ➔ ISTQB Working Party formed with 27 members from several different countries
- ➔ Core team of 15 authors
  - Bernard Homès (chair)
  - Graham Bath, Rex Black, Sigrid Eldh, Jayapradeep Jiothis, Paul Jorgensen, Vipul Kocher, Judy McKay, Thomas Mueller, Klaus Olsen, Randy Rice, Jürgen Richter, Eric Riou Du Cosquer, Mike Smith, Geoff Thompson, Erik Van Veenendaal
- ➔ Consensus reached by core authors
- ➔ Review organized by national boards
  - 72 testing professionals from industry and academic institutions
- ➔ Feedback obtained from training providers in Q4/2006
- ➔ Update to official ISTQB Glossary

The development of the new syllabus was a truly international effort

## Contents



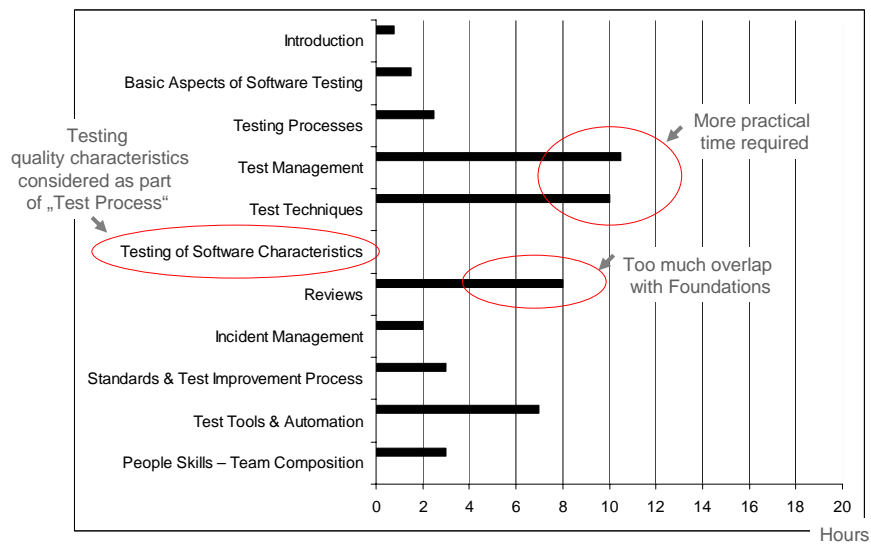
- ➔ Background & strategy ISTQB®
- ➔ Why do we need a new syllabus?
- ➔ **Main improvements**
- ➔ The way forward

## Overview of main improvements



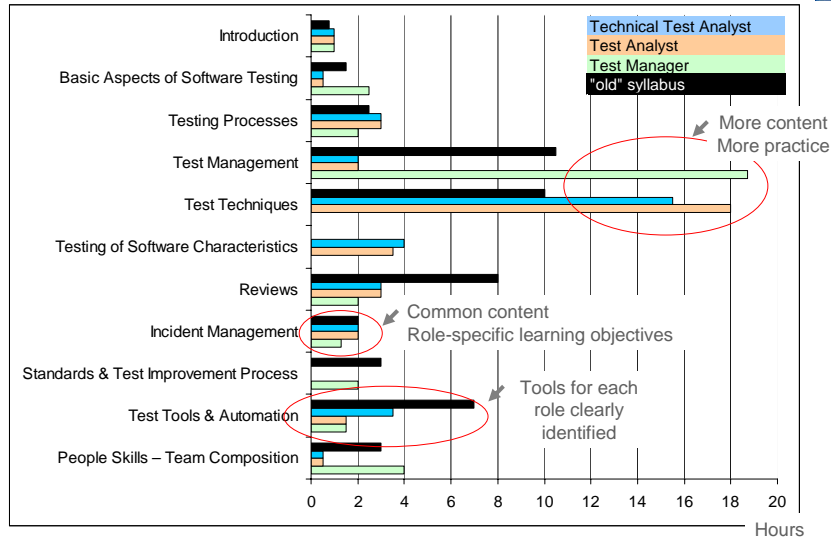
- ➔ More “advanced” content in syllabus
- ➔ More explicit definition of content – fewer “grey areas”
- ➔ Clear progression from foundations level with less overlap
- ➔ More time for practical work
- ➔ Each of the three advanced modules clearly identified
- ➔ Technical Test Analyst has more “profile”
- ➔ Explicit learning objectives for each module

## Time allocation: “Old” Advanced Level Syllabus



Comments show examples of areas for improvement.

## Time allocation: Old/New compared



Comments show examples of changes.

## More time for practical work allocated

- ➔ Levels of knowledge are applied to learning objectives
- ➔ Derived from Bloom's Taxonomy\* of Learning Mastery
- ➔ Four levels
  - K1: "remember"
  - K2: "understand"
  - K3: "apply"
  - K4: "analyze"
- ➔ Each K3 or K4 learning objective requires practical work
- ➔ The new Advanced Level syllabus allocates a realistic amount of time for practical work

More K3/K4 learning objectives have been defined in the new syllabus

\*Bloom, B. S. (1956). *Taxonomy of Educational Objectives, Handbook I: The Cognitive Domain*, David McKay, Co. Inc

## Example of Knowledge Levels: Testing



- **K1 “remember”:**  
Name the functional testing technique that deals with sets of related values of an input variable?
- **K2 “understand”:**  
Boundary Value Testing frequently results in an “explosion” of test cases. Explain why Equivalence Partitioning reduces this problem.
- **K3 “apply”:**
  - How might Equivalence Partitioning address the twin problems of gaps of untested functionality and redundant testing?
  - Be able to apply Equivalence Partitioning for a given specification.
- **K4 “analyze”:**  
Can Equivalence Partitioning reliably reveal faults in functionality that is not specified?

## Principal changes in content



- In the following slides, an overview of principal changes is provided for each chapter of the new Advanced Level syllabus.
- These changes relate to content.
- Remember: there are significant changes to learning objectives as well.
- Colors have been used to identify change types:



New content



Improved content



Deletions

## Principal changes



### 0. Introduction

- ➔ The principal roles Test Manager, Test Analyst and Technical Test Analyst are described in terms of „expectations“
- ➔ For each role a complete list of learning objectives is provided
  - For each chapter of the syllabus
  - For individual learning objectives
  
- ➔ Example layout of learning objectives for Test Analysts
  - **Chapter 3 : Test Management – [120 minutes]**
  - .....
  - 3.9.2 Risk based testing
  - (K3) Prioritize test case selection, test coverage and test data based on risk and document this appropriately in a test schedule and test procedure
  - (K2) Outline the activities of a risk based approach for planning and executing domain testing
  - .....

## Principal changes



### 1. Basic Aspects of Software Testing

- ➔ Specific systems are now explained (characteristics, testing issues)
  - Systems of systems
  - Safety critical systems
  - Note that many aspects covered in the syllabus should also now explained in the context of these types of system
  
- ➔ Metrics and measurement in the software lifecycle (examples, usage)
  
- ➔ Specific example of how testing activities align to a lifecycle model
  
- ➔ Repetition of definitions from the foundations syllabus removed (e.g. regression testing, verification)

## Principal changes



### 2. Testing process

- ➔ The test process has been aligned with the current foundations syllabus
- ➔ Test process models are briefly explained as an alternative way of establishing a test process (and also improving it)
- ➔ Testing software quality characteristics has now become a separate chapter in the new syllabus and is significantly better described.
- ➔ In the old syllabus the names of software quality characteristics were simply listed in the test specification section.

## Principal changes



### 3. Test Management

- ➔ Business value of testing: how to measure and show value
- ➔ Distributed, Outsourced, Insourced testing: basic issues addressed
- ➔ Failure Modes and Effects Analysis
- ➔ Test management issues in specific contexts for:
  - exploratory testing (Session Based Test Management)
  - systems of systems
  - safety critical systems
  - testing non-functional software quality attributes
- ➔ The description of test management documents has been improved (and certain names changed e.g. Test Concept/ Master Test Plan)
- ➔ Major revisions of Progress Monitoring & Risk-based Testing

## Principal changes



### 4. Test Techniques

- Four different categories of techniques are now considered: specification-based, structure-based, exploratory, defect-based
- The All-Pairs technique is now covered
- Several additional structure-based techniques now covered (various types of decision coverage and LCSAJ)
- Use of defect taxonomies
- Attacks as an experience-based technique
- Static analysis of architecture (web-sites, call graphs)
- Dynamic analysis: defects found are described and not just named
- Different learning objectives are set for Test Analyst and Technical Test Analyst (next slide)

## Coverage of techniques



	<u>Test Analyst</u>	<u>Technical Test Analyst</u>
Specification-based	all* (7)	some* (4)
Structure-based	-	all
Defect-based & experience-based	all*	all*
Static analysis	-	all
Dynamic analysis	-	all

\* Where particular techniques apply to both Test Analyst roles, the Training provider is expected to give role-specific examples and exercises

## Principal changes



### 5. Testing of Software Characteristics

The following is a section of the old syllabus:

“Explain the non-functional quality attributes according to ISO 9126/DIN 66272”

- Reliability
- Efficiency
- Usability
- Changeability
- Portability

„Explain“ is simply not enough for an advanced syllabus. In the new syllabus, the Technical Test Analyst learns how to approach the testing of quality attributes at each stage of the testing process

Plus attributes of “lesser importance” e.g.:

- Installability
- Interoperability
- Conformance
- Security
- Recoverability

In the new syllabus these quality attributes are no longer considered to be of „lesser importance“ (they can cause a project to fail entirely if not taken seriously)

## Principal changes



### 5. Testing of Software Characteristics

- ⇒ Entirely new section
- ⇒ Quality attributes for domain testing
  - Accuracy
  - Suitability
  - Interoperability
  - Functional security
  - Usability
  - Accessibility
- ⇒ Quality attributes for technical testing
  - Technical security
  - Reliability
  - Efficiency
  - Maintainability
  - Portability

A more thorough approach is adopted for teaching each software quality characteristic

- Planning and test management issues (chapter 3)
- Typical risks addressed
- Test approaches
- Techniques which can be applied

## Principal changes



### 6. Reviews

- ➔ Repetition of Foundations content now deleted
  - Walkthroughs, informal reviews, technical reviews, inspections deleted from advanced syllabus.
  - Just the basic principals of reviews are stated. Details of the review process are not repeated.
- ➔ Management reviews and audits are covered
- ➔ Success factors are listed. This is an extension of the previous section „Why reviews sometimes fail“.

## Principal changes



### 7. Incident management

- ➔ More descriptive content of the incident management classification process and lifecycle (not just a reference to standard IEEE-1044)
- ➔ Additional sections:
  - When can defects be detected?
  - What kinds of metrics can be gathered?
  - How to communicate incidents

## Principal changes



### 8. Standards & Test Improvement Process

- ➔ Different types of standards and their applicability are introduced
- ➔ Focus is now on test process improvement
- ➔ No longer required to explain and compare CMM, CMMI and ISO15505 (SPICE). CMMI is only briefly covered.
- ➔ The generic process of improving test processes is described
- ➔ Separate descriptions of four test process improvement models:
  - Test Maturity Model: TMM (TMMI)
  - Test Process Improvement Model (TPI)
  - Critical Testing Process (CTP)
  - Systematic Test and Evaluation Process (STEP)

## Principal changes



### 9. Test Tools & Automation

- ➔ Major rework due to considerable overlap with foundations
- ➔ Several automation concepts covered, such as
  - Factors to consider in a cost/benefit analysis for automation
  - Integrating different tools
  - Using keyword-driven test automation
  - Issues of own tool development and using open-source tools
- ➔ More detail given on how to use particular tools (e.g. performance, test-execution, static & dynamic analysis)
- ➔ New types of tool covered
  - Fault seeding and injection
  - Simulators and emulators

## Principal changes



### 10. People Skills – Team Composition

- ➔ The same subjects are now covered in more detail
- ➔ Team role concepts (e.g. Belbin) no longer in syllabus

## Principal changes



### Appendix – Recommendations for Industrialization

- ➔ Helpful recommendations to meet testing challenges
- ➔ Applicable to various chapters of the syllabus
- ➔ Builds on the list of seven basic testing principles introduced at the Foundation Level
- ➔ Training providers will choose the points which are most relevant to the advanced module being taught
- ➔ The items are examinable

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## Next steps



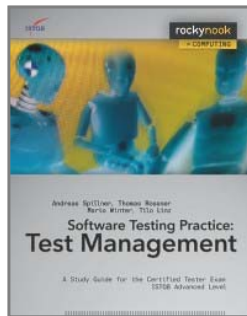
### Prepare!

- ➔ Training providers are creating courses using the new syllabus
- ➔ The Advanced Level syllabus is available at  
[http://www.istqb.org/downloads/syllabi/CTAL\\_Syllabus\\_V\\_2007.pdf](http://www.istqb.org/downloads/syllabi/CTAL_Syllabus_V_2007.pdf)
- ➔ Challenges remain:
  - Creation of questions for examinations
  - Processing of accreditations
  - Managing feedback

## Next steps



- ➔ Books will be available to support the introduction of the new syllabus. For example:



Update available Autumn 2008



A Study Guide for the ISTQB Test Analyst and Technical Test Analyst Advanced Level Certificates

June 2008, approx 384 pages,

ISBN 978-1-933952-24-6

[www.rockynook.com](http://www.rockynook.com)

## Conclusion



- ➔ The new improved advanced level syllabus represents a major step forward.
- ➔ The testing profession will benefit from a standardized high-quality certification at advanced level.
- ➔ The software industry will benefit from a higher level of professionalism in software testing.