Foundation Level Specialist

CTFL® Automotive Software Tester (CTFL®-AuT)

Overview

Version 2018 (1.5) 04.07.2018

International Software Testing Qualifications Board

Revision History

Version	Date	Remarks
1.0	30.03.2017	Initial Version
1.1	08.07.2017	Typo in section 3.2 removed
1.2	13.08.2017	Typo in section 3.2 removed
1.3	18.09.2017	Typos removed and minor improvements integrated
1.4	28.05.2018	Improvements from BETA syllabus review integrated
1.5	04.07.2018	Watermark after GA approval and trademark restriction added removed and for ISTQB® publication.

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Acknowledgements

Registered Trademarks

- CTFL® is a registered trademark of the German Testing Board (GTB) e.V. in EU only.
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- ISTQB® is a registered trademark of the International Software Testing Qualifications Board
- Automotive SPICE® is a registered trademark of the German Association of the Automotive Industry (VDA)

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1 Introduction to the Foundation Level Specialists

This overview document is intended for anyone with an interest in the ISTQB® Foundation Level Specialists who wants a high-level introduction to the leading principles and an overview of the individual specialist syllabi.

From time to time, ISTQB® will update this document to reflect any additional specialists that shall be introduced for the Foundation Level, or to reflect major changes in existing ones. Publications of the updated document will be available on the ISTQB® website.

The ISTQB® Foundation and Advanced Level syllabi have been defined and have been on the market for some time. New topics emerge due to technology and methodology changes in the market which often are brought into the ISTQB® program as new Expert Level syllabi. However, not all topics are suited for the Expert Level. For this reason, the specialist syllabi are established at the Foundation Level to expand the ISTQB® program to incorporate new or updated knowledge. New specialists shall be discussed and introduced by the ISTQB® periodically. Specialists may be established at the Advanced Level as well, but that is beyond the scope of this document.

The following Foundation Level Specialist syllabus has been ISTQB®-released:

- Automotive Software Tester
- Model-Based Tester (released)
- Usability Tester (in Beta)
- Performance Tester (in BETA)
- Gambling Industry Tester (in BETA)

In this document, the Certified Tester Foundation Level – Automotive Software Tester (CTFL®-AuT) syllabus is summarized and the associated Business Outcomes are stated. The Business Outcomes communicate what can be expected from a person who achieves a Foundation Level Specialist Certification in a particular subject area (e.g. Automotive Software Tester), and will outline the benefits for companies that are considering the development of specific testing skills at this level.

2 Introduction to Foundation Level Specialist CTFL® Automotive Software Tester

The certification for Foundation Level Specialist – Automotive Software Tester is designed for professionals who are working within automotive projects. It is also for professionals who are planning to start implementing special automotive testing techniques in the near future, or are working within companies that plan to do so. The certification provides an advantage for those who would like to know the required Automotive activities, roles, techniques, and methodologies specific to their role.

2.1 Intended Audience

The Foundation Level Specialist – CTFL® Automotive Software Tester (CTFL®-AuT) qualification is aimed at four main groups of professionals:

1. Professionals who have achieved in-depth testing experience in traditional methods and would like to get an Automotive Software Tester certificate.
2. Junior professional testers who are just starting in the testing profession, have received the Foundation Level certificate, and would like to know more about the tester's role in an automotive projects.
3. Professionals who are relatively new to testing and are required to implement test approaches, methods and techniques in their day to day job in automotive projects.
4. Professionals who are experienced in their role (including unit testing) and need more understanding and knowledge about how to perform and manage testing on all levels in automotive projects.

These professionals include people who are in roles such as testers, test analysts, test engineers, test consultants, test managers, user acceptance testers, and software developers.

This Foundation Level Specialist – Automotive Software Tester certification may also be appropriate for anyone who wants a deeper understanding of software testing in the automotive world, such as project managers, quality managers, software development managers, business analysts, IT directors, and management consultants.

2.2 Career Paths for Testers

Building on the Foundation Level, the Automotive Software Tester Specialist supports the definition of career paths for professional testers. A person with the Automotive Software Tester certificate has extended the broad understanding of testing acquired at the Foundation Level to enable him or her to work effectively as a professional tester in an automotive project.

In general, the Foundation Level syllabus is examinable at a K1 level, i.e., the candidate will recognize, remember and recall terms and concepts stated in the Foundation Level syllabus.

In addition, all Foundation Level syllabus learning objectives are examinable at the same K-level in an specialist exam. That said, each specialist level exam focuses on the learning objectives defined in that specialist syllabus. The relevant learning objectives at K1, K2, and K3 levels are provided at the beginning of each chapter within each particular specialist syllabus.

2.3 Entry Requirements

To be able to participate in a Foundation Level Specialist – the CTFL® Automotive Software Tester exam, candidates must have obtained the ISTQB® Foundation Level certificate.

2.4 Structure and Course Duration

The Foundation Level Specialist – CTFL® Automotive Software Tester syllabus has no shared or common elements with the Foundation Level syllabus.

The syllabi must be taught in the following minimum number of days:

Syllabus	Days
Baseline: Foundation Core	3
Specialist: CTFL® Automotive Software Tester	2

The following figure shows the structure of the CTFL® Automotive Software Tester Specialist and its relationship to the Foundation Level.
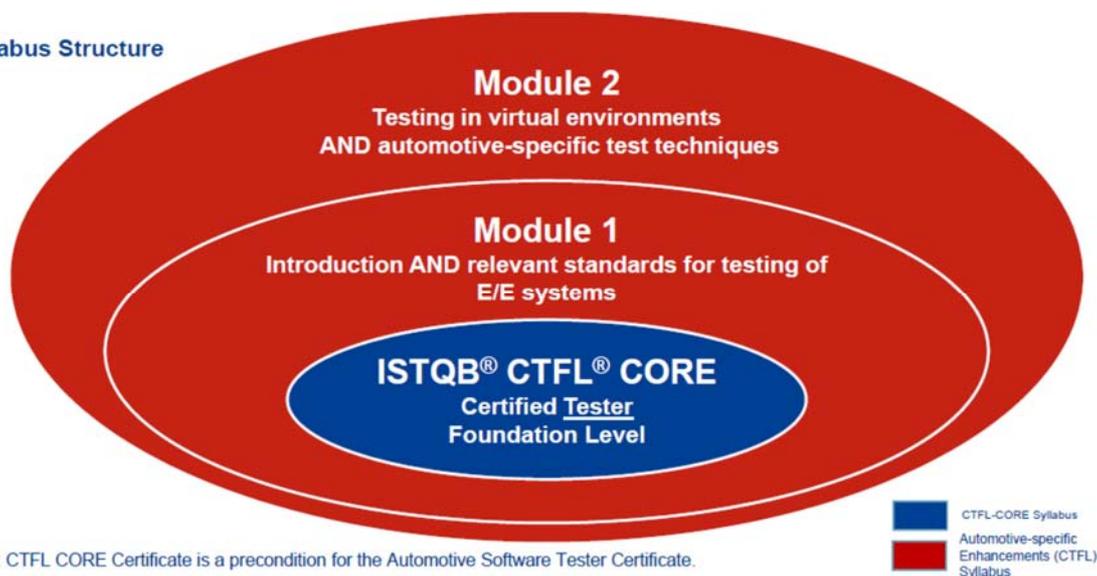
2.5 Keeping It Current

The software industry changes rapidly. To deal with these changes and to provide the stakeholders with access to relevant and current information, the ISTQB® working groups have created links on the www.istqb.org web site which refer to supporting documents, changes to standards and new occurrences in the industry. This information is not examinable under this syllabus.

3 Overview of the Foundation Level Specialist – CTFL® Automotive Software Tester Syllabus

3.1 Business Outcomes

This section lists the Business Outcomes expected of a candidate who has achieved the Foundation Level Specialist – CTFL® Automotive Software Tester certification.

A CTFL® - Automotive Software Tester (CTFL®-AuT) can…

AUTFL-BO-01   Collaborate effectively in a test team.

AUTFL-BO-02   Adapt the test techniques known from the ISTQB® Certified Tester Foundation Level (CTFL®) to the specific automotive project requirements.

AUTFL_BO-03   Consider the basic requirements of the relevant automotive standards (Automotive SPICE®, ISO 26262, etc.) and select suitable test techniques.

AUTFL_BO-04   Support the test team in the risk based planning of the test activities and apply known elements of structuring and prioritization.

AUTFL_BO-05   Apply the virtual test methods (e.g. HiL, SiL, MiL, etc.) in test environments.

In general, a Certified Tester Foundation Level – CTFL® Automotive Software Tester is expected to have acquired the necessary skills to working effectively within an automotive testing team and environment.

3.2 Content

Chapter 1: Introduction

- The tester should be able to explain and give examples of the challenges of automotive product development that arise from divergent project objectives and increasing product complexity.
- The tester should be able to recall project aspects that are influenced by standards such as time, cost, quality and project/product risks.
- The tester should be able to recall the six generic phases in the system life cycle per ISO/IEC 24748-1
- The tester should be able to recall the contribution and the collaboration of the tester in the release process.

Chapter 2: Standards for the testing of E/E systems

ASPICE

- The tester should be able to recall the two dimensions of Automotive SPICE® (ASPICE).
- The tester should be able to explain the Capability levels 0 to 3 of ASPICE.
- The tester should be able to recall the purpose of the 5 test relevant processes of ASPICE.
- The tester should be able to explain the meaning of the 4 rating levels and the capability indicators of ASPICE from the test perspective.
- The tester should be able to explain the requirements of ASPICE for the test strategy including the regression test strategy.
- The tester should be able to recall the requirements of ASPICE for the test documentation.
- The tester should be able to design a verification strategy (in contrast to a test strategy) and criteria for unit verification.
- The tester should be able to explain the different traceability requirements of ASPICE from the test perspective.

ISO 26262

- The tester should be able to explain the objective of functional safety for E/E systems.
- The tester should be able to recall his contribution as a tester for the safety culture.
- The tester should be able to present the role of the tester in the framework of the safety life cycle per ISO 26262.
- The tester should be able to recall the volumes (part titles) of ISO 26262 that are relevant for him.
- The tester should be able to recall the criticality levels of ASIL.
- The tester should be able to explain the influence of ASIL on applicable test design techniques and test types for static and dynamic tests and the resulting test extent.
- The tester should be able to apply the selected method table of the ISO 26262.

AUTOSAR

- The tester should be able to recall the objectives of AUTOSAR.
- The tester should be able to recall the influences of AUTOSAR on the work of the tester.

Comparison

- The tester should be able to recall the different objectives of ASPICE and ISO 26262.
- The tester should be able to explain the differences between ASPICE, ISO 26262 and CTFL® regarding the test levels.

Chapter 3: Testing in a virtual environment

Test Environment in General

- The tester should be able to recall the purpose/the motivation of a test environment in the automotive environment.
- The tester should be able to recall the general parts of an automotive specific test environment.
- The tester should be able to recall the differences between Closed-Loop systems and Open-Loop systems.
- The tester should be able to recall the essential functions, databases and protocols of an electronic control unit (ECU).

Testing in XiL environments

- The tester should be able to recall the structure of a MiL test environment.
- The tester should be able to explain the application area and the boundary conditions of a MiL test environment.
- The tester should be able to reproduce the structure of an SiL test environment.
- The tester should be able to recall the structure of an HiL test environment.
- The tester should be able to explain the application areas and the boundary conditions of an HiL test environment.
- The tester should be able to summarize the advantages and disadvantages for the testing with the help of criteria of the XiL test environments (MiL, SiL and HiL).
- The tester should be able to apply criteria for the assignment of a given test scope to one or more test environments.
- The tester should be able to classify the three XiL test environments (MiL, SiL, HiL) in the V-model.

Chapter 4: Automotive-specific static and dynamic test techniques

Static test techniques

- The tester should be able to explain the purpose, the types and obligations of the MISRA-C:2012 programming guideline with the help of examples.
- The tester should be able to apply a review of requirements with the quality characteristics of the ISO/IEC 29148 that are relevant for him.

Dynamic test techniques
- The tester should be able to create test cases to achieve modified condition/decision testing coverage.
- The tester should be able to explain the use of back-to-back testing by giving examples.
- The tester should be able to explain the principle of fault injection tests by giving examples.
- The tester should be able to recall the principles of requirement-based testing.
- The tester should be able to apply context dependent criteria for the choice of suitable and necessary test design techniques.

4 References

4.1 Documents related to the ISTQB® CTFL®-AuT Certification

The documents related to the ISTQB® CTFL®-AuT Certification are the following:

- General overview (this document) – It provides the business outcomes of the certification and gives the lists of learning objectives[1];
- Syllabus – It details the overall syllabus for ISTQB® CTFL®-AuT;
- Glossary of Terms – It provides the definition of the terms defined in each chapter, to be added in ISTQB® glossary (ongoing process);
- Exam Structure and Rules – A document that provides general rules for CTFL® Specialists and the exam structure for the CTFL® Automotive Software Tester exam;
- Sample Exam Questions – A document that provides samples of CTFL® Automotive Software Tester exam questions;
- Accreditation Guidelines – It provides the accreditation rules of CTFL® Automotive Software Tester;

4.2 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
- CTFL® is a registered trademark of the German Testing Board (GTB) e.V.
- GTB® is a registered trademark of the German Testing Board (GTB) e.V.
- Automotive SPICE® is a registered trademark of the German Association of the Automotive Industry (VDA)

4.3 Documents and Web Sites

Identifier	Reference
[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)
[GTB-Web]	Web site of the German Testing Board. Refer to the latest GTB Glossary and Syllabi. (http://www.german-testing-board.info)

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[1] Informative learning objectives from syllabus are not included.