



Assessor Training Syllabus
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1. Introduction

1.1. Document Overview

This document is intended for Training Providers who will design, develop, and/or deliver SPICE Assessor Training for ISO/IEC TR 15504. The purpose of this document is to provide an Assessor Training Syllabus to ensure that courses developed and delivered by Training Providers cover the recommended minimum set of required competencies necessary to conduct an assessment conformant with ISO/IEC TR 15504. The goal is to provide a common framework for the training offered by various Providers, and to assure that training adequately addresses the contents of ISO/IEC TR 15504:1998, *Software Process Assessment*. The competency-based approach focuses on the desired participant outcomes of the training. One benefit to be derived from a competency-based approach is that it emphasizes results participants should expect to achieve, not just content to be covered. This document also gives guidance for course design of the training.

1.2. Structure of Document

This document contains six sections.

Section 1: Introduction

Explains the purpose and contents of this document.

Section 2: Course Requirements

Identifies the topic areas which must be covered.

Section 3: Competency-Based Approach

Explains the competency-based approach upon which the syllabus is based.

Section 4: Course Design

Specifies the target audience, prerequisites, content, organization, and instructional methods.

Section 5: Assessor Training Syllabus

Specifies the competencies which should be covered.

Section 6: Auxiliary Competencies

Suggests additional competency categories which could help an Assessor perform his/her assessment tasks. These are included for consideration, but are not required.

1.3. References

The contents of this document are based upon ISO/IEC TR 15504:1998 - Software Process Assessment.

- Part 1 : *Concepts and introductory guide*
- Part 2 : *A reference model for processes and process capability*
- Part 3 : *Performing an assessment*
- Part 4 : *Guide to performing assessments*
- Part 5 : *An assessment model and indicator guidance*
- Part 6 : *Guide to competency of assessors*
- Part 7 : *Guide for use in process improvement*
- Part 8 : *Guide for use in determining supplier process capability*
- Part 9 : *Vocabulary*

2. Course Requirements

The Assessor Training Syllabus is intended to follow the outline as specified in *ISO/IEC TR 15504-6:1998, Guide to Competency of Assessors* as shown below.

2.1. Overview of the framework for process assessment

- Background
- Architecture and principles
- The component parts of ISO/IEC TR 15504:1998
- Vocabulary and definitions
- Comparison of ISO/IEC TR 15504:1998 with other standards/methodologies
- Assessment vs. auditing
- How to use the parts of ISO/IEC TR 15504:1998

2.2. The Process Assessment Architecture

(Based on *ISO/IEC TR 15504-2: A reference model for processes and process capability*)

- Process categories
- Processes and process purposes
- Process attributes and capability levels
- Rating processes and the process capability level model
- Requirements for compatible models
- How to use ISO/IEC TR 15504-2.

2.3. Process Assessment

(Based on *ISO/IEC TR 15504-3 : Performing an assessment* and *ISO/IEC TR 15504-4 : Guide to performing assessments*)

- Defining the assessment input
- Responsibilities
- The assessment process
- Recording the assessment output
- Determining ratings
- Validation of ratings
- Presentation of assessment results
- Selection and use of assessment models, methods and tools
- How to use ISO/IEC TR 15504-3 and -4.

2.4. Compatible Models for Assessment

(Based on the compatibility requirements in ISO/IEC TR 15504-2, which are satisfied by *ISO/IEC TR 15504-5 : An assessment model and indicator guidance*)

- The purpose of an assessment model
- Model elements, indicators and mapping
- Using indicators
- Translating assessment results to process profiles
- How to use the assessment model

3. Competency-Based Approach

3.1. Assessor Competencies

Competencies are the skills, knowledge, and personal attributes that enable effective performance [as defined in ISO/IEC TR 15504-1, Section 4.3]. Where possible, competencies are expressed as observable, actionable goals.

Competencies are a basic set of learning goals. Each competency completes the following statement: "After completion of this course, an assessor will be able to...".

The competencies described in the Assessor Training Syllabus are those pertaining to knowledge and skills. Competencies related to personal attributes are not included in the syllabus because they are difficult to assess objectively. However, the personal attributes are included for reference.

The competencies in the Assessor Training Syllabus are the recommended minimum set. Training Providers may add to the minimum set.

3.2. Assessor Training Course

Training Providers are expected to specify how an assessor will achieve each of the competencies in the Assessor Training Syllabus. At a minimum, the Provider should specify actions and performance criteria for each competency. Ideally, the Provider should address who, what, when, why, and how, for each competency.

Training Providers should provide a mechanism to trace course content to the competencies in the Assessor Training Syllabus (Section 5 of this document).

The competencies for each of the topic areas outlined in ISO/IEC TR 15504-6 are listed in the accompanying Assessor Training Syllabus.

4. Course Design

4.1. Target Population

The target population for the training activity are individuals who are familiar with assessment, and who desire to gain and demonstrate competency as Assessors as defined in ISO/IEC TR 15504-6.

4.2. Course Prerequisites

The competencies participants possess influence their future performance and needs as Assessors. Characteristics of competency as an Assessor are stated in ISO/IEC TR 15504-6. Prerequisites for entry into a training course will vary depending on the stage of the participant in his/her job role, and length of time in his/her organization.

The emphasis of the Assessor Training Syllabus is to prepare participants to perform SOFTWARE PROCESS ASSESSMENT, not assessments in general. Therefore, participants in the training course should possess prerequisite familiarity with:

- total quality management principles, tools, techniques, including quality assurance and quality improvement;
- the concept of assessment models.

The auxiliary competencies listed in Section 6 of this syllabus are helpful but are not a prerequisite.

4.3. Course Content

Course content must support achievement of all of the competencies identified in this syllabus.

4.4. Course Organization

The Assessor Training Syllabus identifies the recommended competencies, but does not specify how the competencies are to be achieved. It is up to the Provider to select the course design which will best achieve the syllabus goals. For example, the Provider may choose to present the competencies in a series of courses or modules, rather than in a single course.

4.5. Course Sequence

Training Providers may address the competencies and topic areas in any sequence.

Exception: The course should introduce the Process Dimension BEFORE the Process Capability Dimension, and give examples of these.

4.6. Course Methods

It is up to the Training Provider to select appropriate instructional methods based on professional judgment. An appropriate combination of experiential, lecturing, group, and individual work, should be used to support the course goals .

The course must take participants through at least one process assessment using examples, hands-on exercises, or other experiential methods.

Case study or other experiential methods should be supported by an instructor-facilitated discussion session. The discussion session should give participants the opportunity to seek information beyond what is contained in the case study, and to raise and debate various points of view on the case issues. Participants should be encouraged to defend their opinions with evidence and reason. The discussion session should permit the Instructor to check participant skills in inquiry, analysis, and decision making. The course should contain guidance for evaluating process capability at the "Performed" level.

4.7. Course Assessment

Training Providers are advised to include a mechanism for soliciting participant course evaluations and for recording, analyzing, and acting on participant feedback received. Such assessment mechanisms may include both daily and end-of-course assessments to provide evidence that the course offers an appropriate "learning opportunity" for participants.

5. Assessor Training Syllabus

The main headings in this syllabus follow the outline provided in ISO/IEC TR 15504-6. The subordinate clauses are the competencies.

5.1. Overview of ISO/IEC TR 15504

1.0 INTRODUCTION TO THE COURSE

Position the course and its role in the context of assessment.

1.1 Relate the course to the qualification process for assessors. Identify other, non-training actions needed for initial and ongoing qualification as an assessor.

1.2 Identify the competencies included in this course.

2.0 BACKGROUND

Understand the evolution of process assessment, its impact on the software engineering field, and its relationship to TQM concepts.

2.1 Outline the background and antecedents of ISO/IEC TR 15504 Software Process Assessment.

3.0 ARCHITECTURE AND PRINCIPLES

3.1 Explain and draw the ISO/IEC TR 15504 Software Process Assessment architecture.

3.2 Explain the principles which underpin the ISO/IEC TR 15504 Software Process Assessment product suite.

4.0 PRODUCT SUITE

4.1 Explain the ISO/IEC TR 15504 Software Process Assessment product suite.

5.0 DEFINITIONS

5.1 Explain key terms and terminology in ISO/IEC TR 15504 Software Process Assessment product suite.

6.0 ASSESSMENT VS. AUDITING

6.1 Compare and contrast assessment as performed in ISO/IEC TR 15504 Software Process Assessment with conformance auditing.

7.0 COMPARISON OF ISO/IEC TR 15504: SOFTWARE PROCESS ASSESSMENT WITH OTHER STANDARDS AND METHODOLOGIES

7.1 Compare and contrast ISO/IEC TR 15504 Software Process Assessment with other standards e.g. ISO 9001, ISO 9000-3, and ISO/IEC 12207 and its Assessment Model with other models e.g. CMM, Trillium, Bootstrap. Distinguish software process assessment standards from other quality standards. Note: Other relevant standards may be substituted or added for comparison based on local needs. Only a high level comparison of concepts is required.

8.0 HOW TO USE THE ISO/IEC TR 15504 SOFTWARE PROCESS ASSESSMENT PRODUCT SUITE

8.1 Identify and describe the factors which determine whether an assessment is conformant with ISO/IEC TR 15504 Software Process Assessment.

8.2 Identify and explain the contexts in which ISO/IEC TR 15504 Software Process Assessment may be used.

9.0 SUMMARY

9.1 Summarize key points and lessons learned.

5.2. The Process Model

1.0 INTRODUCTION

Obtain an understanding of the Process Model Architecture including both the Reference Model (ISO/IEC TR 15504-2) and an Assessment Model .

- 1.1 Describe the field of application (intended audience and use).
- 1.2 Define the purpose.
- 1.3 Define the objectives.
- 1.4 Identify the advantages and limitations of Process Model use.
- 1.5 Explain the structure of the Reference Model (ISO/IEC TR 15504-2), Assessment Model (ISO/IEC TR 15504-5) and the relationship of other Compatible Assessment Models with the Reference Model.

2.0 DEFINITIONS

Acquire a conceptual understanding of the Process Model.

- 2.1 Define key terms upon which Process Model concepts are based.

3.0 COMPONENTS OF THE REFERENCE MODEL (ISO/IEC TR 15504-2)

Develop familiarity with the Reference Model components. (e.g. Process Category, Process, Process Purpose, Process Attribute, Capability Level). The intent is to develop an overall understanding of how the Reference Model addresses assessment and classifies practices.

- 3.1 Explain the architecture.
- 3.2 Describe the components and give examples of each.
- 3.3 Explain using visual aids the relationship among the components.
- 3.4 Explain the notation used for the various components..

4.0 DETAILED ARCHITECTURE

Obtain a more detailed understanding of the Process Categories, Processes, Capability Levels, Process Attributes and their interrelationships.

- 4.1 Explain the concept of capability levels and process attributes.
- 4.2 Describe each of the process categories.
- 4.3 Demonstrate an understanding of the processes.
- 4.4 Demonstrate a mapping of Organization Unit processes to the Reference Model.

5.0 COMPONENTS OF AN ASSESSMENT MODEL .

Obtain an understanding of either the Assessment Model of ISO/IEC TR 15504-5, or a compatible assessment model structure. In the case of ISO/IEC TR 15504-5:

- 5.1 Explain and define the base practices.
- 5.2 Explain the use and scope of the base practices.
- 5.3 From a given scenario (e.g. case study, examples, videos, playlets) exercise judgment to identify the set of base practices operating in an Organizational Unit.
- 5.4 **Error! No index entries found.** Explain the management practices.
- 5.5 Explain the interrelationships between management practices, process attributes and capability levels.

6.0 APPLICATION

This section is for practical exercises and examples to reinforce concepts through application. Application exercises should give participants the opportunity to use the Reference Model (ISO/IEC TR 15504-2) in conjunction with the ISO/IEC TR 15504-3 and -4 and an Assessment

Model. It is expected that examples and exercises in other sections of the course will also draw upon the Reference Model.

6.1 Complete practice exercises in the application of the Process Assessment (ISO/IEC TR 15504-2 and ISO/IEC TR 15504-3) to assessment tasks.

7.0 SUMMARY

7.1 Summarize key points and lessons learned.

5.3. Process Assessment

1.0 INTRODUCTION

1.1 Explain the rationale for process assessment. Justify the need, and explain the outcomes of process assessment.

1.2 Explain the critical success factors (facilitators/ inhibitors) for a process assessment.

1.3 Explain and give examples of assessment context (e.g.. ISO/IEC TR 15504-7 and -8).

2.0 ASSESSMENT PREPARATION

Understand how to prepare for an assessment.

2.1 Identify assessment inputs (purpose, scope, constraints, characteristics).

2.2 Explain and demonstrate how assessment inputs can be reviewed.

2.3 Identify and explain criteria for selection of an assessment team.

2.4 Allocate team roles.

2.5 Prepare and conduct a team briefing.

2.6 Explain how risk factors are identified and to whom they are reported.

2.7 Select a suite of appropriate assessment techniques (interviews, questionnaires, documentation reviews etc.).

2.8 Select an appropriate assessment instrument.

2.9 Develop an assessment schedule.

2.10 Prepare a complete assessment plan.

2.11 Explain the duties of OU coordinators.

2.12 Prepare and conduct OU briefing.

2.13 Explain how participants are selected.

2.14 Explain confidentiality issues.

2.15 Identify criteria for the support documentation and records.

3.0 CONDUCT OF ASSESSMENTS

Understand how information is collected, verified, and cross-referenced. Implement the assessment plan.

3.1 Required activities in an assessment (Planning, Data Collection, Data Validation, Process Rating, Reporting).

3.2 Using an assessment instrument:

3.3 Explain how information is collected.

3.4 Explain and demonstrate how information is categorized.

3.5 Explain how information is verified and how compliance is assessed.

3.6 Guide the assessment and promote discussion.

4.0 DETERMINATION OF ACTUAL RATINGS

Understand how actual ratings for process instances are determined. Using an assessment instrument, perform a practice exercise.

- 4.1 Explain the rating reference.
- 4.2 Describe fully the Process Dimension.
- 4.3 Describe fully the Capability Dimension.
- 4.4 Explain and demonstrate a process profile.
- 4.5 Complete a practice exercise on ratings.
- 5.0 VALIDATION OF RATINGS
 - 5.1 Explain and demonstrate the mechanisms by which ratings can be validated.
- 6.0 REPORTING ASSESSMENT RESULTS
 - Relate assessment results to the assessment context (See also competency 8.2 under *Overview of ISO/IEC TR 15504* and competencies 1.3 and 2.1 under *Process Assessment*).
 - 6.1 Explain and demonstrate how assessment outputs can be presented.
 - 6.2 Explain the requirements for content of the Assessment Record.
 - 6.3 Explain the requirements for reporting assessment results.
- 7.0 ASSESSMENT CONFORMANCE
 - 7.1 Explain and demonstrate how an assessment can be checked for conformity and non-conformity to the requirements of ISO/IEC TR 15504 Software Process Assessment
- 8.0 APPLICATION OF ISO/IEC TR 15504-3 AND -4
 - Review the effectiveness of the assessment (what worked, what didn't, what value was added, critical success factors).
 - 8.1 Guide a review of the assessment after its completion.
- 9.0 SUMMARY
 - 9.1 Summarize key points and lessons learned.

5.4. Compatible Assessment Models

- 1.0 INTRODUCTION
 - 1.1 Define the purpose of a compatible assessment model
 - 1.2 Describe how a compatible model supports process assessment.
 - 1.3 Describe how a compatible model supports the requirements defined in ISO/IEC TR 15504.
 - 1.4 Explain the requirements for compatibility of an assessment model from ISO/IEC TR 15504-2.
 - 1.5 List the inputs to, and outputs from a compatible model
 - 1.6 Identify the types of the assessment indicators.
 - 1.7 Describe how the assessment indicators relate to the organisations process
 - 1.8 Identify the advantages and limitations of assessment indicators.
 - 1.9 Identify misuses of the assessment indicators.
- 2.0 USING A COMPATIBLE MODEL
 - For purposes of illustration only, a sample instrument will be presented so participants can learn the process to:
 - 2.1 Apply the tool's scoping characteristics to define the scope and context of an assessment.
 - 2.2 Map an organizational unit's actual work products to those listed in the compatible model

- 2.3 Apply the compatible model's scoping characteristics to select the appropriate indicators for a given scope and type of assessment.
 - 2.4 Use the indicators to make guided judgments about process existence and process capability.
 - 2.5 Use the tool to score, record, and present assessment results.
 - 2.6 Use the assessment tool to produce ratings.
 - 2.7 Store other information captured during an assessment.
- 3.0 SUMMARY
- 3.1 Summarize key points and lessons learned.

6. Auxiliary Competencies

The Assessor Training Syllabus presents the minimum set of competencies that an Assessor must possess to perform an assessment effectively. They are NOT the total set of competencies an Assessor will need in his/her lifetime. Many of the skills needed for SOFTWARE PROCESS ASSESSMENT are not unique to SOFTWARE PROCESS ASSESSMENT, or to assessment. Some examples are meeting management and problem solving skills. Additionally, the total set of competencies will depend on the assessor's role, the assessment mode, the organization's needs, and business objectives. The following are auxiliary, non-required competency categories which Providers might want to consider. To allow flexibility to meet local needs, only the competency categories are listed, not the specific competencies.

Administration

- *Change management
- *Conflict management
- *Employee involvement
- *Risk management
- *Problem solving

Communication and feedback

- *Interpersonal skills
- *Interviewing
- *Listening
- *Observation
- *Presentations
- *Teaching
- *Record keeping
- *Report writing

Leadership

- *Influence skills
- *Decision making
- *Facilitation
- *Project management
- *Meeting management
- *Team building
- *Time management

Knowledge of the business

- *Supplier management
- *Supporting activities

Software engineering

- *Data analysis
- *Quantitative methods
- *Software estimation
- *Software life cycle activities
- *Software metrics