Guideline for Training Provider

The Certification Program of GfSE

This document describes the route to become a licensed training provider for the systems engineering certification program of GfSE e.V., the SE-ZERT®. This includes commercial training providers and academic institutions.

The SE-ZERT® program of GfSE e.V. gives individuals holding a technical degree the opportunity to obtain an independent certification in the area of systems engineering.

As a formal approval of the competencies, the graduates are awarded a certificate with the logo of the GFSE e.V. and a seal (trade mark) "Certified Systems Engineer (GfSE)" indicating the achieved level.

Currently the GfSE does not fulfill the prerequisites to act as a certifying body for certification of individuals. Therefore, a cooperation partner is required to perform the certification in analogy to ISO/IEC 17024.

The goal of the SE-ZERT® program is to provide an independent and standardised professional education. It is similar to other offers of professional education in Germany and satisfies the current demand. The trainings are offered in German and English. As German chapter of INCOSE, the GfSE has aligned its offering with the INCOSE SEP program.

This vocational education in the area of systems engineering with a final knowledge exam fulfills professional standards. Such professional standard permits comparability during acquisition and supply. The certification per EN ISO/IEC 17024 enables employees to prove competencies validated by an independent body. This is attested by a certificate issued according to the rules of a certification system.
The certificate SE-ZERT testifies that the graduate has technical, social and context specific competences to work as systems engineer. These competences are taught by certified trainers.

Important Note:
SE-ZERT is an individual certification and no company related certification. Legal relation exists between GfSE and individuals. Consequently, form sheets shall be filled with personal data (addresses etc.). In case the employer bears the cost, this is an agreement between the employer and the individual.

The requirements set by the GfSE for the certification program in 2011 are:

- Establish a standard for systems engineering education

- Vocational education for engineers and technicians including practical exercises and with content for individuals interested in systems engineering

- Application of ISO 15288 as well as ISO 19760 (guide for SE) and of the INCOSE SE Handbook shall be trained.

- Overview on cross-industrial standards and regulations shall be given

- The content shall be presented in a way suitable for practitioners

- The content shall be applicable across industries

- The training shall be concluded with a knowledge exam

- The examination and issuing the certificate shall be executed by an internationally accredited organization in analogy to EN ISO/IEC 17024. The goal is an independent assessment and most objective evaluation.

- The development of content shall result from the collaboration of experienced systems engineers under the governance of the GfSE.

- Equivalency with the INCOSE certificates ASEP, CSEP and ESEP shall be possible.

- The certification program PM-ZERT® of GPM e.V. (IPMA) for project management with several levels and modules shall serve as a boilerplate during the introduction phase.

- Content overlap with PM-ZERT® should be avoided unless necessary and sensible. PM-ZERT® and SE-ZERT should complement each other and emphasise the differences.

- Content overlap with quality management certification for individuals should be avoided unless necessary and sensible.

SE-ZERT® build up on three levels of competence. The entry level C focuses on understanding. Level B focuses on application where level A is on mastering and hence is the expert level. For the particular levels different prerequisites apply.

Depending on the desired qualification level, the following knowledge will be certified:

- SE-ZERT, Level C

    o Basic knowledge of systems engineering and systems engineering management

    o An understanding and in certain areas even the ability to apply the core knowledge of SE, enabling participation in projects

    o Proof of participation in the training with practical exercises (hands-on training for selected topics)

    o Knowledge exam based on the INCOSE SE handbook and relevant standards (across industries)

- SE-ZERT, Level B

  - Advanced knowledge of systems engineering and systems engineering management

  - The ability to apply the core knowledge of SE and master some of its aspects, enabling to carry out projects autonomously

  - Proof of participation in the training with practical exercises (hands-on training with an end-to-end project example emphasising the interdependencies)

  - Advanced knowledge exam based on the INCOSE SE handbook and relevant standards (across industries)

- SE-ZERT, Level A

  - Expert knowledge of systems engineering and systems engineering management

  - The ability to teach SE and mastering all processes as well as being able to lead them.

  - A study work with subsequent assessment interview by an exam board.

An overview about these levels had been compiled during the GfSE workshop in February 2011 and is depicted in Table 1 hereafter.

Table 1: SE-ZERT® Levels, a work product of the GfSE Workshop

Level	Evidence	Examination	Goal
Level A: Expert	• Evidence for level B • Professional experience • Study work • Interview	Assessment	Lead Teach
Level B: Advanced	• Technical degree • Professional experience • Evidence of training • Own project	Written exam	Independent
Level C: Entry Level	• Technical degree • Professional experience • Evidence of training • Example projects	Written exam	Contribute

Training Goals

The training goals for each level are described in a module handbook as a curriculum.

GfSE-ZD-004	Modulhandbuch für SE-Zert Level C
GfSE-ZD-006	Modulhandbuch für SE-Zert Level B
GfSE-ZD-007	Modulhandbuch für SE-Zert Level A

REMARK: documents available currently only in German language.

Requirements to Training Providers

The general requirements to training providers and trainer in this document are complementary to those described in the curriculum. For the licensing of training provider, a compliance sheet will be provided with detailed requirements for each training module or to the related documents references.

Universities are permitted to provide trainings for level D within their teaching activities after licensing by the GfSE.

Overview

Curriculum and compliance sheet provide the basis to develop the training program. The training goals defer between the levels and are defined in the curriculum of each level. For each module the required trainer skills are allocated (e.g., PM, SE, CSEP, Level B, Level A, or minimum of five years of professional experience).

Requirements to the trainer

Hereafter are the required trainer skills are listed applicable per module for the levels D, C and B.

Note: For level A support in developing the study work may be offered. A dedicated training is not required.

Table 2: Required Skills of Trainers per Module

Module	Required Skills of Trainer for Level C and B		Required Skills of Trainer within Universities (Level D)
1	5 years of professional experience		
2	5 years of professional experience		
3	PM-ZERT or similar		
4	CSEP / Level B		Evidence of skills of the professor (e.g., documentation on academic appointment, practical experiences in industries, etc.)
5	CSEP / Level B	Level A	
6	CSEP / Level B		
7	5 years of professional experience		
8	5 years of professional experience		
9	5 years of professional experience in the area of social skills		

Prerequisites for training provider related to trainers

- At least one trainer shall have a valid CSEP certificate by INCOSE or a valid level B certificate by GfSE.

- Each additional trainer shall have at least five years of professional experience in the wider area of systems engineering.

- Trainer for the social competences shall have a dedicated education in this field which needs to be proofed.

- At least one trainer shall have professional experiences in project management of minimum five years and shall provide a valid certificate PM-ZERT (GPM-IPMA) or PMP (PMI).

- At least one trainer shall proof professional experience in quality management of minimum five years.

Requirements to the training design
Assessors will judge the training design during the licensing of training providers.

- Completeness of the training per curriculum by GfSE.

  o Complete coverage of the handbook (i.e. content of modules)

o The training comprises adequate exercises related to the specific training goals per level (see curriculum).

o The training shall be cross-industries or specific for a dedicated industry according to the preannouncement by the training provider.

o An adequate example for exercises shall be available.

o The approval of the training and training materials will be given by the GfSE assessors.

o The overall goal of the level D and C training is teaching of theoretical knowledge of systems engineering. Exercises serve to demonstrate the training content.

o The overall goal of the level B training is teaching of practical and applicable knowledge of systems engineering. Exercises serve to practice methods and procedures of systems engineering.

  ▪ Level B trainings shall comprise exercises for module 3, module 4, module 5, module 6 and module 9. This may be combined with exercises in other modules.

  ▪ It is recommended for level B trainings to provide exercises for modules 2, 7, 8.

Relation between training provider and GfSE

- Persons of the GfSE involved with the licensing of a training provider shall not be economically or in other way dependent on that applicant/training provider.

- Training providers are obliged to immediately notify changes of training materials or trainers, at least four weeks prior to the next training.

- The licensing of a training provider is to renew with the renewal frequency of the trainer certification. This will be charged and is defined in the license agreement.

- The applying company shall be corporative member of the GfSE.

- The licensing of training providers is based on the compliance sheet.

- Training providers of level B trainings shall offer on request admission courses (lateral entry) per admission requirements for level B.

Steps towards the licensing

Universities
a) The course of studies in systems engineering shall be certified.
b) if needed, select additional qualified trainers (contract lecturers)
c) Declare compliance to the curriculum
d) Provide documentation of training content and training design
  a. Curriculum of the certified course of studies
  b. Presentation slides
  c. Adapted exercises
  d. Documentation for participants (hand-out)
e) Comply with legal requirements
  a. Become corporate member of GfSE
  b. Sign license agreement
  c. Sign brans usage agreement
  d. Pay license fees

Commercial Training Providers

a) Document training program
b) Select appropriate trainers
c) Declare compliance to the curriculum
d) Provide certificate of competence of trainers
e) Provide documentation of training content and training design
  a. Training guide
  b. Presentation slides
  c. Adapted exercises
  d. Documentation for participants (hand-out)
f) Comply with legal requirements
  a. Become corporate member of GfSE
  b. Sign license agreement
  c. Sign brans usage agreement
  d. Pay license fees

Activities during Operation

Supporting of Candidates

Basically, the scope of the service to be provided is not prescribed and therefore in the responsibility of the trainers. The actual processes can be found on the SE-ZERT internet site.
It is wished that candidates are supported by the trainers.

Additional Roles

- SE-TREC GmbH:
    - SE-TREC is the point of contact for admission and other all questions.
    - SE-TREC checks the provided applications and approves candidates for the exam.
    - Items remaining open will be forwarded by SE-TREC to the SE-ZERT assessors for final clarification.
    - SE-TREC organizes the exams.
    - SE-TREC does the examination.
    - SE-TREC checks answers to multiple choice questions based on an solution sheet.
    - SE-TREC approves the (re-)certification and send the certificates to the trainer.
    - SE-TREC checks for (re-)certification.
    - SE-TREC collects the exam fee.
    - SE-TREC handles objections by candidates.
- SE-ZERT assessors
    - define exam questions.
    - check answers to open questions.
    - decide in case of questions to the qualification in coordination with SE-TREC
- GfSE Office
    - supports the SE-ZERT assessors
    - sends seals to trainees after receiving signed brand usage agreement
    - reminds for re-certification
    - handles requests to get SEP equivalence with INCOSE certificate (optional for candidates)

Continuous Improvement Process and Interactions

The SE-ZERT assessors report changes and provide recommendations to the trainers. The interactions are online or on the TdSE.

Legal Terms

License Agreement

The contractual relation between the GfSE and the training provider is defined in the license agreement. In the ramp-up phase until realizing the business case, the committee of the GfSE grants a discount which will be negotiated each year.

Obligation for Change Notification

The obligation to notify changes is part of both, the license agreement and the brand usage agreement. Basically, the training provider is obliged to notify changes related to trainer and training including therein referenced materials.

Trademarks

Note:

- The figurative trade mark „GfSE Certified Systems Engineer" is a registered trade mark of Gesellschaft für Systems Engineering e.V. for EU and Switzerland.
- „GfSE Certified Systems Engineer" is a registered trademark of Gesellschaft für Systems Engineering e.V. in Germany.
- „SE-ZERT" is a registered trade mark of Gesellschaft für Systems Engineering e.V. for EU and Switzerland.
- „Certified Systems Engineer (GfSE)" is a registered trademark of Gesellschaft für Systems Engineering e.V. in Germany.

Quality Assurance (Audits)

The SE-ZERT assessors reserve the right to audit trainings. Training provider will be notified in written form and in due time. The related requirements are defined in the license agreement.