TRIZ Certification by ICG T&C:
Assignments and Evaluation Criteria

Approved by MATRIZ

MATRIZ CERTIFICATION LEVEL 1

A decision regarding Level 1 certification is made by an accredited representative of the MATRIZ Council on Expertise and Methodology at ICG Training and Consulting.

THEORY AND TOOLS

1. Differences between systematic and non-systematic approaches to innovation and inventive problem solving.
2. Types of value innovation tasks.
3. Inventive problem.
4. Levels of solutions.
5. Origins of TRIZ.
6. Basic ideas of TRIZ, resources, ideality.
7. A process with TRIZ and TRIZ Roadmap.
8. Tools of TRIZ.
9. Problem Perception Mapping and Innovation Questionnaire.
10. Types of contradictions.
11. Root-Conflict Analysis.
12. Contradiction Matrix and generating ideas with 40 Inventive Principles.
13. Evaluation of the ideas. Multi-Criteria Decision Matrix (MCDM) and Ideas Landscape.

TASKS (INCLUDED TO THE ASSIGNMENTS) FOR CERTIFICATION TRAINING OF LEVEL 1:

1. Building a Multi-Screen Thinking Diagram.
2. Formulation of Ideal Final Result for an inventive problem. Problem solving with the Ideal Final Result. Applying the TRIZ Criteria for selecting the most ideal solution.
3. Problem Perception Mapping and Innovation Questionnaire.
4. Performing Root-Conflict Analysis of an inventive problem.
5. Ranking and selecting contradictions from the Root-Conflict Analysis model.
6. Application of the Contradiction Matrix and generating ideas with 40 Inventive Principles.
7. Evaluation of the ideas obtained with Multi-Criteria Decision Matrix (MCDM) and.

EVALUATION CRITERIA FOR CERTIFICATION LEVEL 1:

- Understanding the paradigm of Multi-Screen Thinking.
- Ability to apply Multi-Screen Thinking and Multi-Screen Diagram.
- Correctness of an exercise with Multi-Screen Diagram.
- Understanding a concept of contradiction.
- Understanding administrative, technical and physical contradictions.
- Correctness of identifying technical and physical contradictions.
- Ability of recognizing contradictions which were resolved in the past and how resolving contradictions impacted system's evolution.

- Ability of recognizing current problems to be presented in form of technical and physical contradictions.
- Understanding a concept of Ideal Final Result.
- Correctness of an exercise with Ideal Final Result.
- Correctness of using the TRIZ Criteria for evaluation of solutions Ideality.
- Understanding the use of resources to increase solutions Ideality.
- Understanding casual links between causes and effects creating a problem.
- Understanding RCA+ approach.
- Correctness of a process with RCA+
- Correctness of performing a process of selecting technical contradictions from RCA+ Model.
- Understanding the Contradiction Matrix.
- Correctness of using the Contradiction Matrix.
- Correctness of application of 40 Inventive Principles.
- Ability to use resources in combination with recommendations given in the inventive principles.
- Understanding generation of new ideas based on combination of generated ideas.
- Application of Multi-Criteria Decision Matrix (MCDM) to evaluate ideas.
- Correctness of Ideas Landscape.
- Novelty and ideality of ideas generated during the course.

Requirements for successful certification: 1) If certification is obtained through the certification training: oral examination and test, or a project performed during or after the certification training course. 2) if certification is made outside training: oral examination, test.

MATRIZ CERTIFICATION LEVEL 2

A decision regarding Level 2 certification is made by an accredited representative of the MATRIZ Council on Expertise and Methodology at ICG Training and Consulting.

Level 2 can only be awarded if a candidate already holds Level 1 certificate from MATRIZ and successfully completes certification training of Level 2, or if a candidate already holds Level 1 certificate from MATRIZ and successfully completes a certification test based on the level 2 certification assignments.

THEORY AND TOOLS

1. Origins of Advanced TRIZ.
2. A roadmap of Advanced TRIZ.
3. Tools of Advanced TRIZ.
4. TRIZ-based approach to understanding functions.
5. TRIZ-based Function Analysis of technical systems: Component model, Interaction Model.
6. A process with the TRIZ-based Function Analysis.
7. Extracting and ranking function-related problems with TRIZ-based Function Analysis.
8. Functional hierarchy in a Function Model.
9. Functional-Ideal Modelling (Trimming).
10. Scenarios of Trimming.
11. TRIZ Catalogues of Scientific Effects
12. Substance-Field Modeling of technical systems and inventive problems.
13. A system of 76 Inventive Standards (Standard Solutions to inventive problems)
14. Solving problems selected from Function Models with a system of 76 Inventive Standards.
15. Overview of models of technology evolution.
16. Trends of technology and technical systems evolution.

17. Introduction to the Algorithm of Inventive Problem Solving (ARIZ).

TASKS (INCLUDED TO THE ASSIGNMENTS) FOR CERTIFICATION TRAINING OF LEVEL 2:

1. Performing Function Analysis to model an existing technical system or its subsystem.
2. Identification of existing and potential problems in Function Model.
3. Ranking problems in the Function Analysis Model.
4. Identification of functional hierarchy of a technical system.
5. Performing Trimming of a technical system and generating ideas.
6. Generating ideas with the TRIZ Catalogues of Effects to solve an inventive problem.
7. Building Substance-Field Models of inventive problems.
8. Applying Inventive Standards for Change to solve an inventive problem.
9. Applying Inventive Standards for Measurement and Detection to solve an inventive problem.
10. Building S-curve and Bell-curve evolution models of a technical system.
11. Generating new ideas with the TRIZ Trends and Lines of Technology Evolution.

EVALUATION CRITERIA FOR CERTIFICATION LEVEL 2:

- Understanding advanced TRIZ and its tools.
- Understanding the process of Functional Analysis.
- Correctness of a Functional Model.
- Correctness of identification of problems in the Function Analysis Model.
- Completeness of identification of existing and potential problems in the Function Analysis Model.
- Correctness of ranking problems in the Function Analysis Model.
- Correctness of functional hierarchy in the Function Analysis Model.
- Understanding the process of Trimming.
- Correctness of applying trimming rules.
- Understanding substance-field modeling.
- Correctness of building substance-field models of problems.
- Correctness of using inventive standards to generate new ideas.
- Correctness of using the TRIZ Catalogues of Scientific Effects to generate new ideas.
- Correctness of problem solving by using the Scientific Effects.
- Understanding S-curve and Bell-curve of evolution.
- Understanding of the system of TRIZ Laws, Trends and Lines of technology evolution.
- Correctness of the Evolutionary Potential Analysis.
- Understanding a process of generating new ideas with the TRIZ Trends and Lines of Technology Evolution.
- Correctness of application of the TRIZ Trends and Lines of Technology Evolution to generate new ideas.
- Novelty and ideality of ideas generated during the course.

Requirements for successful certification: 1) If certification is obtained through the certification training: an individual project performed during or after the certification training course which confirms knowledge of necessary subjects. 2) if certification is made without training: oral examination, test, or a project confirming knowledge of necessary subjects.

MATRIZ CERTIFICATION LEVEL 3

A decision regarding Level 3 certification is made by an accredited representative of the MATRIZ Council on Expertise and Methodology at ICG Training and Consulting.

Level 3 can only be awarded if a candidate already holds Level 2 certificate from MATRIZ and successfully completes certification training of Level 3, or if a candidate already holds Level 2 certificate from MATRIZ and successfully completes a certification test based on the level 3 certification assignments.

THEORY AND TOOLS

1. Creative Imagination Development techniques: Focal Objects, Parameters Intensification, Hybridization, Multi-Stories Modeling, Method of Trends, Gold Fish, Fantogramma.
2. Algorithm of Inventive Problem solving (ARIZ).
3. Subversion Analysis: inverting an inventive problem to research problem.
4. Anticipatory Failures Analysis process to forecast potential problems.
5. Alternative technical systems and alternative contradictions. Feature Transfer. Creating new technical systems with Feature Transfer.
6. Value-Conflict Mapping for strategic understanding of barriers preventing development of a technical system. Extraction and ranking of blocking contradictions with Value-Conflict Mapping.
7. TRIZ-based Forecast and Innovation Roadmapping. Scenarios of Innovation Evolution. Models of technology and technical systems evolution. Laws of technology and technical systems evolution.
8. Trends of technology and technical systems evolution. Functionality Evolution.
9. Innovation Tree and Innovation Roadmap.

TASKS (INCLUDED TO THE ASSIGNMENTS) FOR CERTIFICATION TRAINING OF LEVEL 3:

1. Performing a process with Algorithm of Inventive Problem Solving (ARIZ) to solve an inventive problem. Using analytical tool (either RCA+ or CECA) to identify a problem for ARIZ.
2. Performing a process with Anticipatory Failure Determination to extract potential inventive problems.
3. Performing a process with Feature Transfer to resolve alternative contradiction.
4. Performing a process with Value-Conflict Mapping to identify evolution blocking contradictions. Ranking and selecting contradictions extracted from Value-Conflict Mapping.
5. Performing a process with TRIZ-based Forecast and Innovation Roadmapping to generate new ideas with the Trends of Technical Systems Evolution, and build innovation roadmap.
6. Evaluation of ideas obtained with TRIZ-based Forecast and Innovation Roadmapping.
7. Applying Creative Imagination Development techniques to develop creative imagination and develop new ideas: Focal Objects, Parameters Intensification, Hybridization, Multi-Stories Modeling, Method of Trends, Gold Fish, Fantogramma.

EVALUATION CRITERIA FOR CERTIFICATION LEVEL 3:

- Knowledge of history of TRIZ.
- Understanding ARIZ, its logic and steps.
- Correctness of application of ARIZ to solve an inventive problem.
- Understanding Anticipatory Failures Analysis process.
- Correctness of application of Anticipatory Failures Analysis.

- Completeness of the list of problems and failures from Anticipatory Failures Analysis.
- Understanding a process with Feature Transfer.
- Correctness of identifying alternative contradictions.
- Correctness of application of Feature Transfer.
- Correctness of the process of resolving the alternative contradictions.
- Understanding of Value-Conflict Mapping.
- Correctness of identifying and ranking of blocking contradictions.
- Correctness of application of Value-Conflict Mapping.
- Understanding the process of TRIZ-based Forecast and Innovation Roadmapping.
- Understanding a process of generating new ideas with the TRIZ-based Forecast and Innovation Roadmapping.
- Correctness of application of the Trends and Lines of Evolution to generate and structure new ideas.
- Correctness of building Innovation Roadmap.
- Correctness of using Technology Forecast ideas evaluation.
- Correctness of identifying S-jumps.
- Understanding Functionality Evolution.
- Correctness of identifying of Functionality Evolution phases.
- Novelty and ideality of ideas generated during the course.

Requirements for successful certification: 1) If certification is obtained through the certification training: an individual project confirming knowledge of necessary subjects. 2) if certification is made outside training: oral examination, test and an individual project confirming knowledge of necessary subjects.

MATRIZ CERTIFICATION LEVEL 4

Level 4 "TRIZ Specialist" is awarded on the basis of evaluating results of performing a real case-based innovative project with advanced TRIZ tools which provides a proof of novelty and feasibility of the project results and demonstrate advanced knowledge and skills with TRIZ by a candidate.

Level 4 can only be awarded if a candidate holds Level 3 certificate from MATRIZ. The requirements for level 4 can be found at MATRIZ website, www.matriz.org.

A decision regarding Level 4 certification is made by the MATRIZ Council on Expertise and Methodology.

MATRIZ CERTIFICATION LEVEL 5

Level 5 "TRIZ Master" is awarded for significant contribution to the development of TRIZ and large experience with practical or theoretical work with TRIZ. Awarding Level 5 requires either a proof of significant contribution to TRIZ by an applicant or successfully defending a dissertation related to TRIZ development. The requirements for level 5 can be found at MATRIZ website, www.matriz.org.

Level 5 can only be awarded if a candidate holds Level 4 certificate from MATRIZ or if contribution of the applicant can be confirmed by relevant documents and materials.

A decision regarding Level 5 certification is made by the TRIZ Master Certification Council of MATRIZ.