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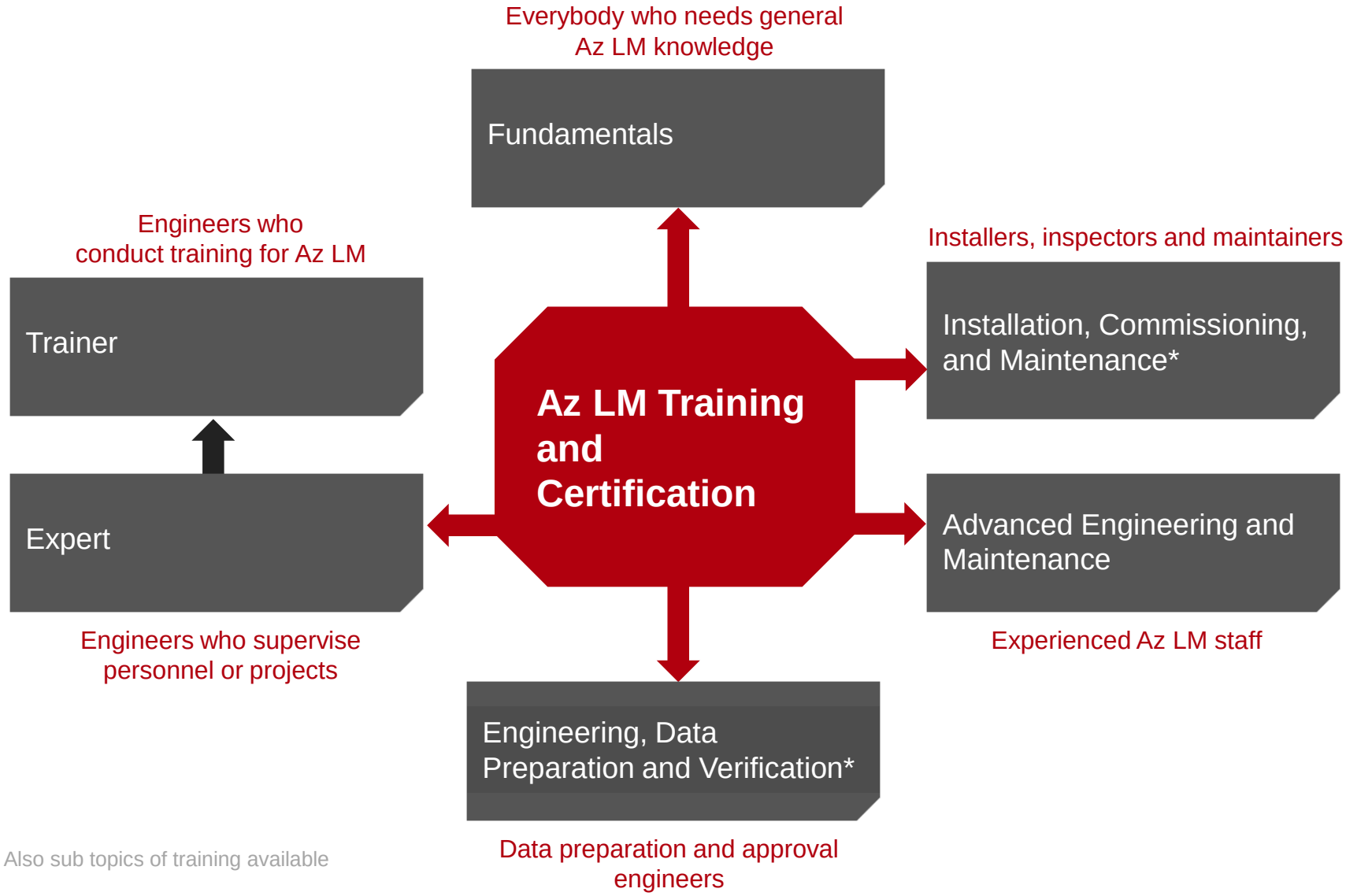
Axle Counter Az LM

Training and Certification

Az LM Training Overview



* Also sub topics of training available

Certification Levels

Validity of Certificates: 2 years

Trainer Level

Participants reaching the appropriate expert level are certified to deliver the respective training by test-teaching examination

Expert Level

Comprehensive training including all areas of knowledge certified in written and practical examinations

Certification Level

Training objectives certified in written and hands-on examinations

Participation Level

Participant’s training attendance is confirmed without knowledge transfer verification

Course Overview

Course	Duration	Examination	Expert	Trainer
Fundamentals	1 day		10 days	5 days
Installation and Commissioning	3 days	+0.5 days		
Maintenance	3 days	+0.5 days		
Installation, Commissioning, and Maintenance	4 days	+0.5 days		
Engineering and Data Preparation	5.5 days	+0.5 days		
Engineering and Data Verification	5.5 days	+0.5 days		
Engineering, Data Preparation and Verification	7 days	+0.5 days		
Advanced Engineering and Maintenance	2 days			

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Courses and Certification

Az LM – Fundamentals

Course target

- Delivery of required basic knowledge for comprehensive system understanding of Az LM

Duration
- 1 day

Prerequisites
- Basic railway signalling knowledge

Audience
- Everybody who needs general Az LM knowledge

Maximum number of participants
- 12

Az LM – Installation and Commissioning

Course target

- Delivery of required professional knowledge for installation and commissioning of Az LM

Duration
- 3 days

Prerequisites
- Basic knowledge of signalling engineering and railway operation

Audience
- Installation and commissioning staff, acceptance inspector

Maximum number of participants
- 8

Introduction Train Detection	Structure and Functions	Hardware	Interfaces	Installation	Commissioning
1.5 hours	1.5 hours	3 hours	3 hours	4.5 hours	4.5 hours

Az LM – Maintenance

Course target

- Delivery of required professional knowledge for maintenance of Az LM

Duration
- 3 days

Prerequisites
- Basic knowledge of signalling engineering and railway operation

Audience
- Maintenance staff

Maximum number of participants
- 8

Introduction Train Detection	Structure and Functions	Hardware	Interfaces	Maintenance-related Installation & Commissioning	Preventive and Corrective Maintenance
1.5 hours	1.5 hours	3 hours	3 hours	3 hours	6 hours

Az LM – Installation, Commissioning and Maintenance

Course target

- Delivery of required professional knowledge for installation, commissioning and maintenance of Az LM

Duration
- 4 days

Prerequisites
- Basic knowledge of signalling engineering and railway operation

Audience
- Installation and commissioning staff, acceptance inspector, maintenance staff

Maximum number of participants
- 8

Introduction Train Detection	Structure and Functions	Hardware	Interfaces	Installation	Commissioning	Preventive and Corrective Maintenance
1.5 hours	1.5 hours	3 hours	3 hours	4.5 hours	4.5 hours	6 hours

Az LM – Engineering and Data Preparation

Course target

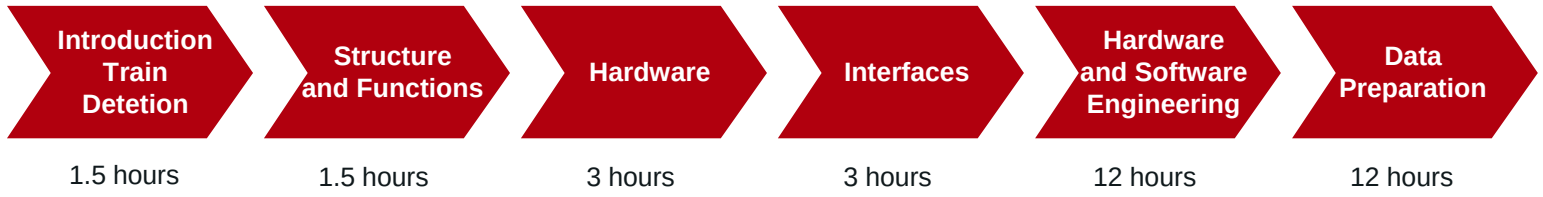
- Delivery of required professional knowledge for engineering, generation of application documentation and application data of Az LM

Duration
- 5.5 days

Prerequisites
- Basic knowledge of signalling engineering and railway operation
- Advanced PC skills
- Basic knowledge in using Linux operating systems and TCP/IP-Ethernet transmission

Audience
- Engineering & data preparation staff

Maximum number of participants
- 8



Az LM – Engineering and Data Verification

Course target

- Delivery of required professional knowledge for engineering and application approval of Az LM

Duration
- 5.5 days

Prerequisites
- Basic knowledge of signalling engineering and railway operation
- Advanced PC skills
- Basic knowledge in using Linux operating systems and TCP/IP-Ethernet transmission

Audience
- Data verification staff

Maximum number of participants
- 8

Introduction Train Detection	Structure and Functions	Hardware	Interfaces	Hardware and Software Engineering	Data Testing and Verification
1.5 hours	1.5 hours	3 hours	3 hours	12 hours	12 hours

Az LM – Engineering, Data Preparation and Data Verification

Course target

- Delivery of required professional knowledge for engineering, generation of application documentation and application data, as well as application approval of Az LM

Duration
- 7 days

Prerequisites
- Basic knowledge of signalling engineering and railway operation
- Advanced PC skills
- Basic knowledge in using Linux operating systems and TCP/IP-Ethernet transmission

Audience
- Engineering & data preparation staff, data verification staff

Maximum number of participants
- 8

Introduction Train Detection	Structure and Functions	Hardware	Interfaces	Hardware and Software Engineering	Data Preparation	Data Testing and Verification
1.5 hours	1.5 hours	3 hours	3 hours	12 hours	12 hours	9 hours

Az LM – Advanced Engineering and Maintenance

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Course target

- Delivery of required professional knowledge for advanced engineering and maintenance of Az LM

Duration
- 2 days

Prerequisites
- Basic knowledge of signalling engineering and railway operation

Audience
- Experienced staff with Az LM skills

Maximum number of participants
- 8

Az LM – Certification

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Certification

- Training objectives are certified in written and hands-on examinations

Written Examination

- Participants have to prove that they have the theoretical background to fulfil certification level
- Examinations are according to the learning objectives

Hands-on Examination

- Participants have to prove that they are able to complete the practical exercises to fulfil the certification level
- Examinations are according to the learning objectives

Duration

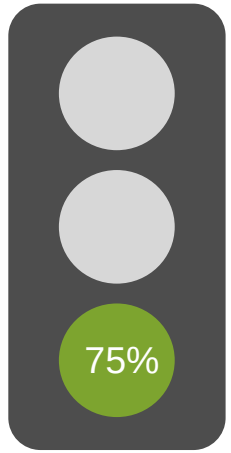
- 0.5 days

Prerequisites

- Completion of related course

1 to 7 days

0.5 days



Az LM – Certified Expert

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Expert Certification

- Comprehensive knowledge and highly experienced in installation, commissioning, and maintenance as well as engineering, data preparation and verification enable engineers to be certified as Az LM Expert

Duration

- 10 days (including 1 day of certification)

Prerequisites

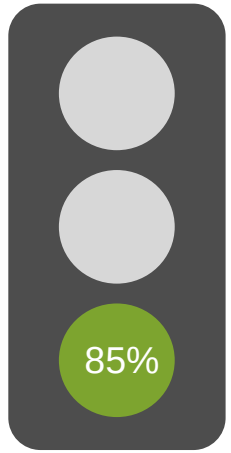
- Basic knowledge of signalling engineering and railway operation
- Advanced PC skills
- Basic knowledge in using Linux operating systems and TCP/IP-Ethernet transmission

Audience

- Engineers who supervise personnel or projects and need thorough understanding

Maximum number of participants

- 4



1 day | 8 days | 1 day

Az LM – Certified Trainer*

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Trainer Certification for Certified Experts

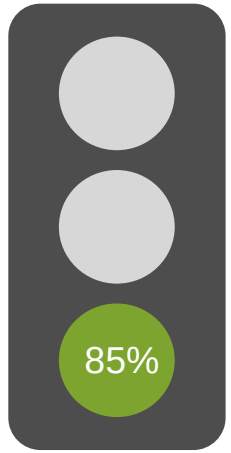
- **Specific training preparation**
  Supported preparation of test training through mentor
- **Test teaching**
  With participants unknown to the topic, the designated trainer has to prove teaching skills through delivery of a test course
- **Debriefing**
  Feedback and wrap-up discussion, graduation

Duration
- 5 days

Prerequisites
- Az LM Certified Expert
- Basics in presentation methods and tendency to free lecture

Audience
- Engineers who conduct Az LM training

Maximum number of participants
- 1

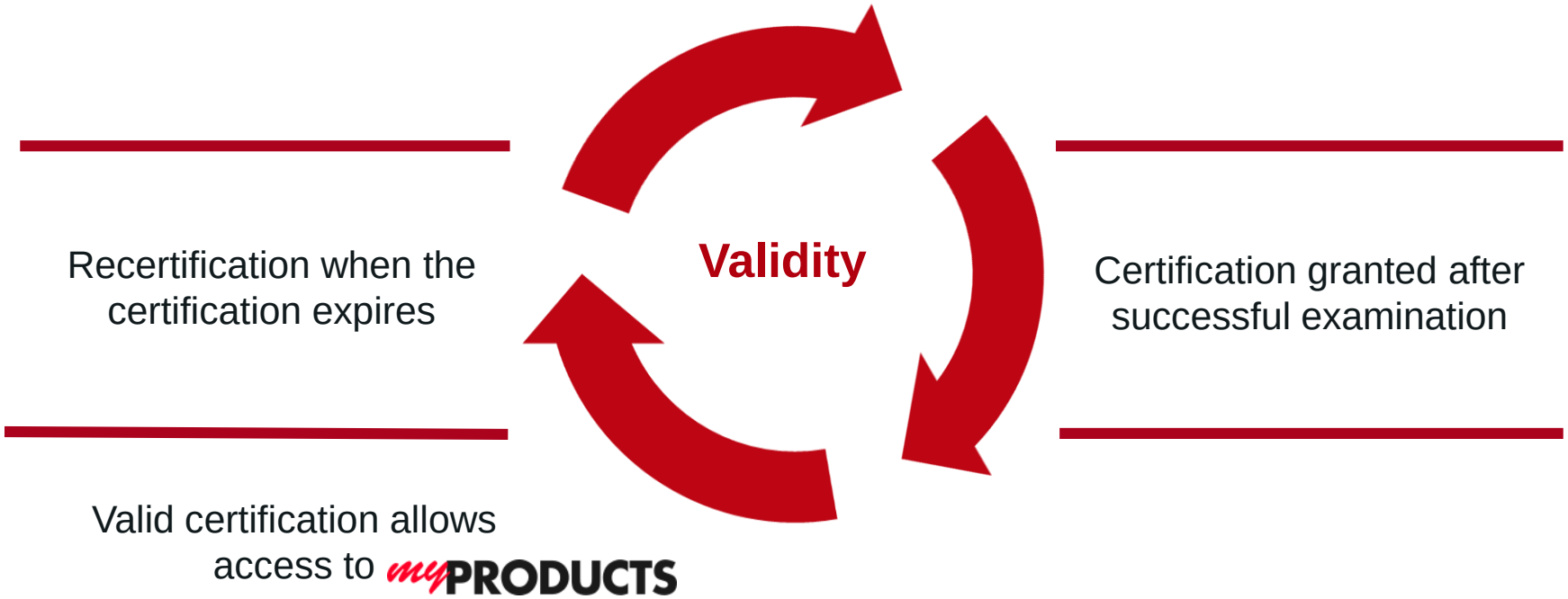


* Trainer receives teaching material

Certification Renewal

Validity
- 2 years, project-related, country-related

Validity extension
- Renewal of certification through knowledge review



Recertification and Upgrade

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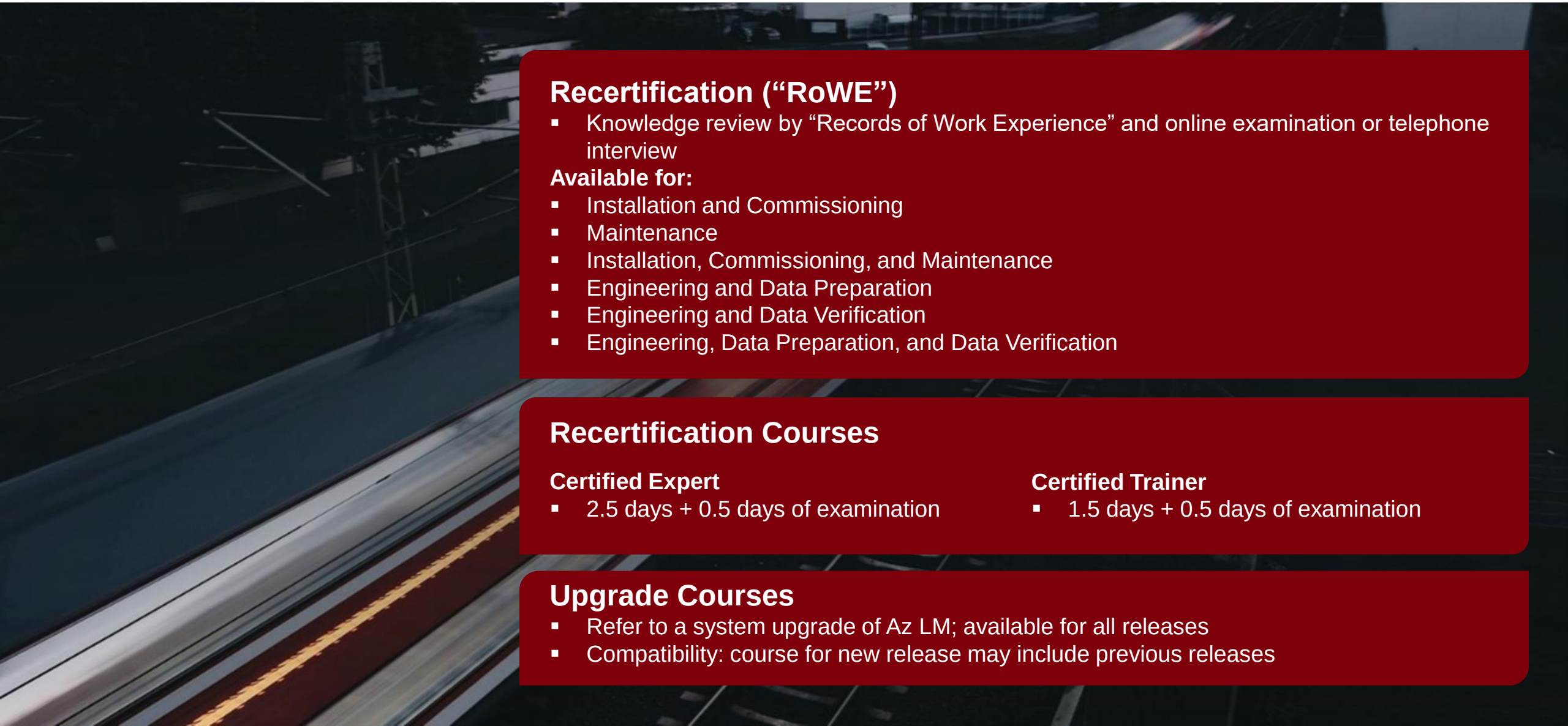

Recertification (“RoWE”)

- Knowledge review by “Records of Work Experience” and online examination or telephone interview

Available for:

- Installation and Commissioning
- Maintenance
- Installation, Commissioning, and Maintenance
- Engineering and Data Preparation
- Engineering and Data Verification
- Engineering, Data Preparation, and Data Verification

Recertification Courses

Certified Expert

- 2.5 days + 0.5 days of examination

Certified Trainer

- 1.5 days + 0.5 days of examination

Upgrade Courses

- Refer to a system upgrade of Az LM; available for all releases
- Compatibility: course for new release may include previous releases

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Course Outline

Az LM – Fundamentals

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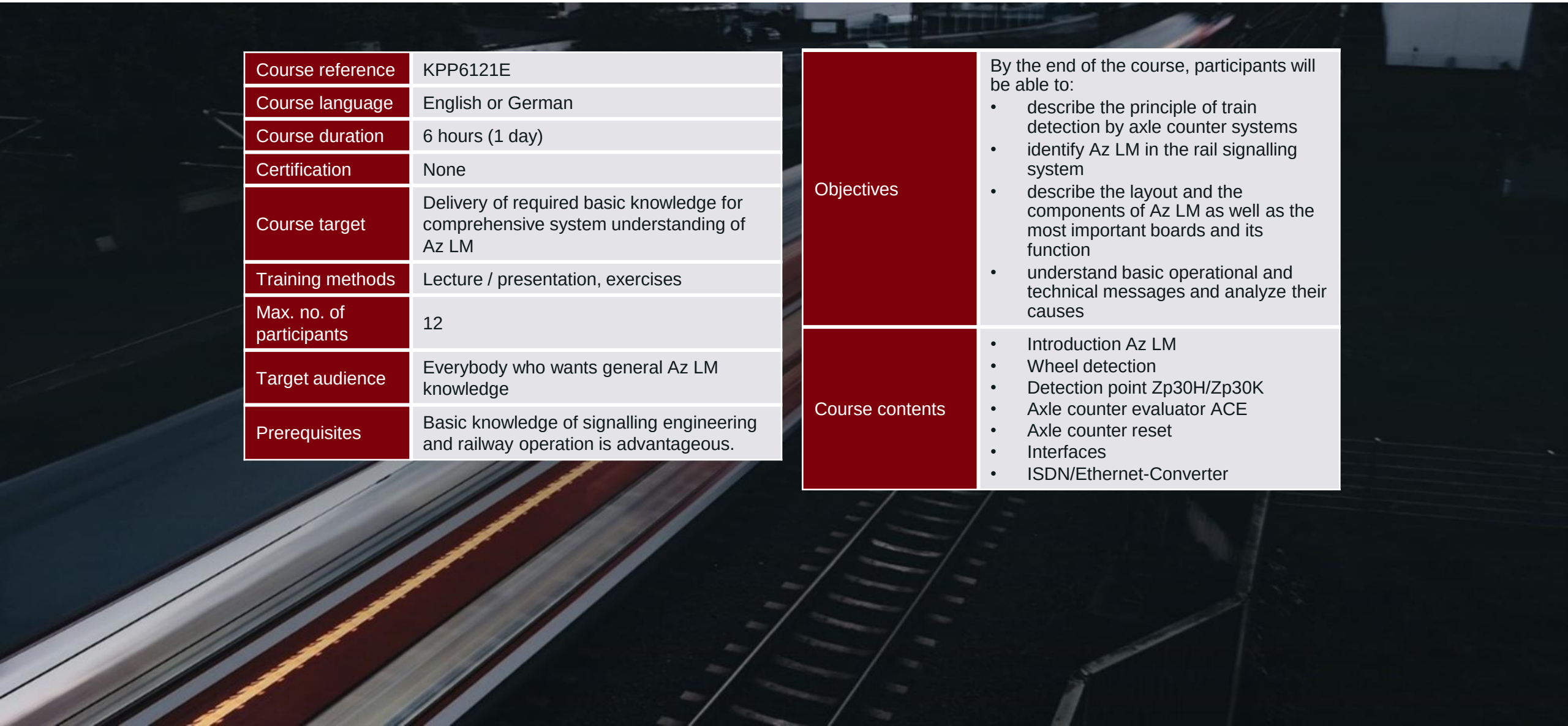

Course reference	KPP6121E
Course language	English or German
Course duration	6 hours (1 day)
Certification	None
Course target	Delivery of required basic knowledge for comprehensive system understanding of Az LM
Training methods	Lecture / presentation, exercises
Max. no. of participants	12
Target audience	Everybody who wants general Az LM knowledge
Prerequisites	Basic knowledge of signalling engineering and railway operation is advantageous.

Objectives	By the end of the course, participants will be able to: • describe the principle of train detection by axle counter systems • identify Az LM in the rail signalling system • describe the layout and the components of Az LM as well as the most important boards and its function • understand basic operational and technical messages and analyze their causes
Course contents	• Introduction Az LM • Wheel detection • Detection point Zp30H/Zp30K • Axle counter evaluator ACE • Axle counter reset • Interfaces • ISDN/Ethernet-Converter

Az LM – Installation and Commissioning

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Course reference	KPP6122E
Course language	English or German
Course duration	18 hours (3 days)
Certification	3 hours (0.5 days) written and hands-on examination
Course target	Delivery of required professional knowledge for installation and commissioning of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Installation and commissioning staff, acceptance inspector
Prerequisites	• Basic knowledge of signalling engineering is required. • Basic knowledge of railway operation is advantageous.

Objectives	By the end of the course, participants will be able to: • describe the layout and the components of Az LM and its function • understand operational and technical messages and analyze their causes • analyze relevant safety application conditions and describe related use cases • carry out installation and commissioning • inspect relevant metrics and settings
Course contents	• Fundamentals • Installation and commissioning

Az LM – Maintenance

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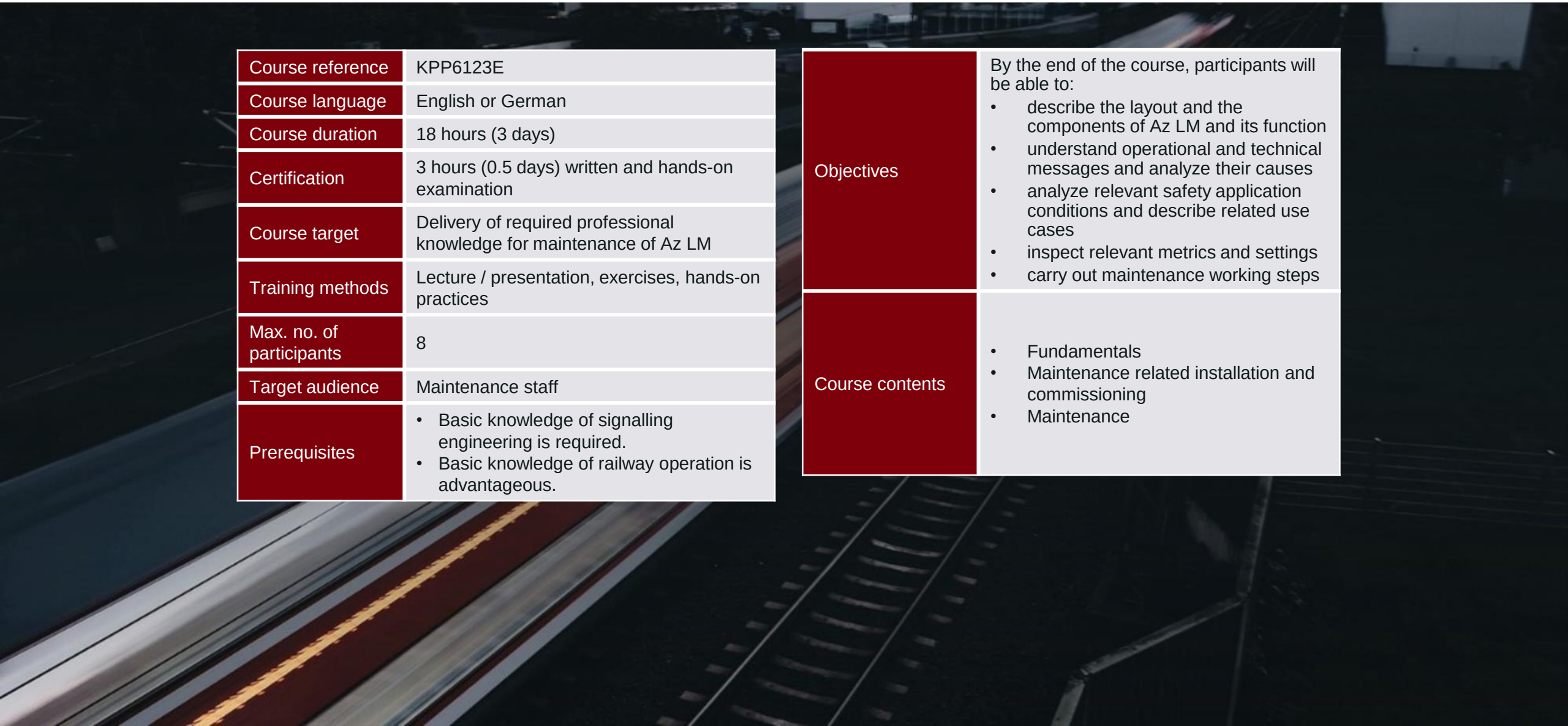

Course reference	KPP6123E
Course language	English or German
Course duration	18 hours (3 days)
Certification	3 hours (0.5 days) written and hands-on examination
Course target	Delivery of required professional knowledge for maintenance of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Maintenance staff
Prerequisites	• Basic knowledge of signalling engineering is required. • Basic knowledge of railway operation is advantageous.

Objectives	By the end of the course, participants will be able to: • describe the layout and the components of Az LM and its function • understand operational and technical messages and analyze their causes • analyze relevant safety application conditions and describe related use cases • inspect relevant metrics and settings • carry out maintenance working steps
Course contents	• Fundamentals • Maintenance related installation and commissioning • Maintenance

Az LM – Installation, Commissioning and Maintenance

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Course reference	KPP6129E
Course language	English or German
Course duration	24 hours (4 days)
Certification	3 hours (0.5 days) written and hands-on examination
Course target	Delivery of required professional knowledge for installation, commissioning, and maintenance of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Installation and commissioning staff, acceptance inspector, maintenance staff
Prerequisites	• Basic knowledge of signalling engineering is required. • Basic knowledge of railway operation is advantageous.

Objectives	By the end of the course, participants will be able to: • describe the layout and the components of Az LM and its function • understand operational and technical messages and analyze their causes • analyze relevant safety application conditions and describe related use cases • carry out installation and commissioning • inspect relevant metrics and settings • carry out maintenance working steps
Course contents	• Fundamentals • Installation and commissioning • Maintenance

Az LM – Engineering and Data Preparation

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Course reference	KPP6125E
Course language	English or German
Course duration	33 hours (5.5 days)
Certification	3 hours (0.5 days) written and hands-on examination
Course target	Delivery of required professional knowledge for engineering, generation of application documentation and application data of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Engineering & data preparation staff
Prerequisites	• Basic knowledge of signalling engineering and of railway operation is required. • Advanced knowledge in using PC is required. • Basic knowledge in using Linux operating systems and TCP/IP-Ethernet transmission is advantageous.

Objectives	By the end of the course, participants will be able to: • describe the layout and the components of Az LM and its function • apply hardware and software engineering according to application rules for engineering and project requirements • create compact-flash-cards for the ACE according to software engineering rules
Course contents	• Fundamentals • Functions • Hardware and software engineering • Data preparation

Az LM – Engineering and Data Verification

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Course reference	KPP6126E
Course language	English or German
Course duration	33 hours (5.5 days)
Certification	3 hours (0.5 days) written and hands-on examination
Course target	Delivery of required professional knowledge for engineering and application approval of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Data verification staff
Prerequisites	Basic knowledge of signalling engineering and of railway operation is required. Advanced knowledge in using PC is required. Basic knowledge in using Linux operating systems and TCP/IP-Ethernet transmission is advantageous.

Objectives	By the end of the course, participants will be able to: • describe the layout and the components of Az LM and its function • apply hardware and software engineering according to application rules for engineering and project requirements • check configurations and settings of the Az LM application on conformity with detailed design documents
Course contents	• Fundamentals • Functions • Hardware and software engineering • Data verification

Az LM – Engineering, Data Preparation and Data Verification

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Course reference	KPP6127E
Course language	English or German
Course duration	42 hours (7 days)
Certification	3 hours (0.5 days) written and hands-on examination
Course target	Delivery of required professional knowledge for engineering, generation of application documentation and application data, as well as application approval of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Engineering & data preparation staff, data verification staff
Prerequisites	Basic knowledge of signalling engineering and of railway operation is required. Advanced knowledge in using PC is required. Basic knowledge in using Linux operating systems and TCP/IP-Ethernet transmission is advantageous.

Objectives	By the end of the course, participants will be able to: • describe the layout and the components of Az LM and its function • apply hardware and software engineering according to application rules for engineering and project requirements • create compact-flash-cards for the ACE according to software engineering rules • check configurations and settings of the Az LM application on conformity with detailed design documents
Course contents	• Fundamentals • Functions • Hardware and software engineering • Data preparation and data verification

Az LM – Advanced Engineering and Maintenance

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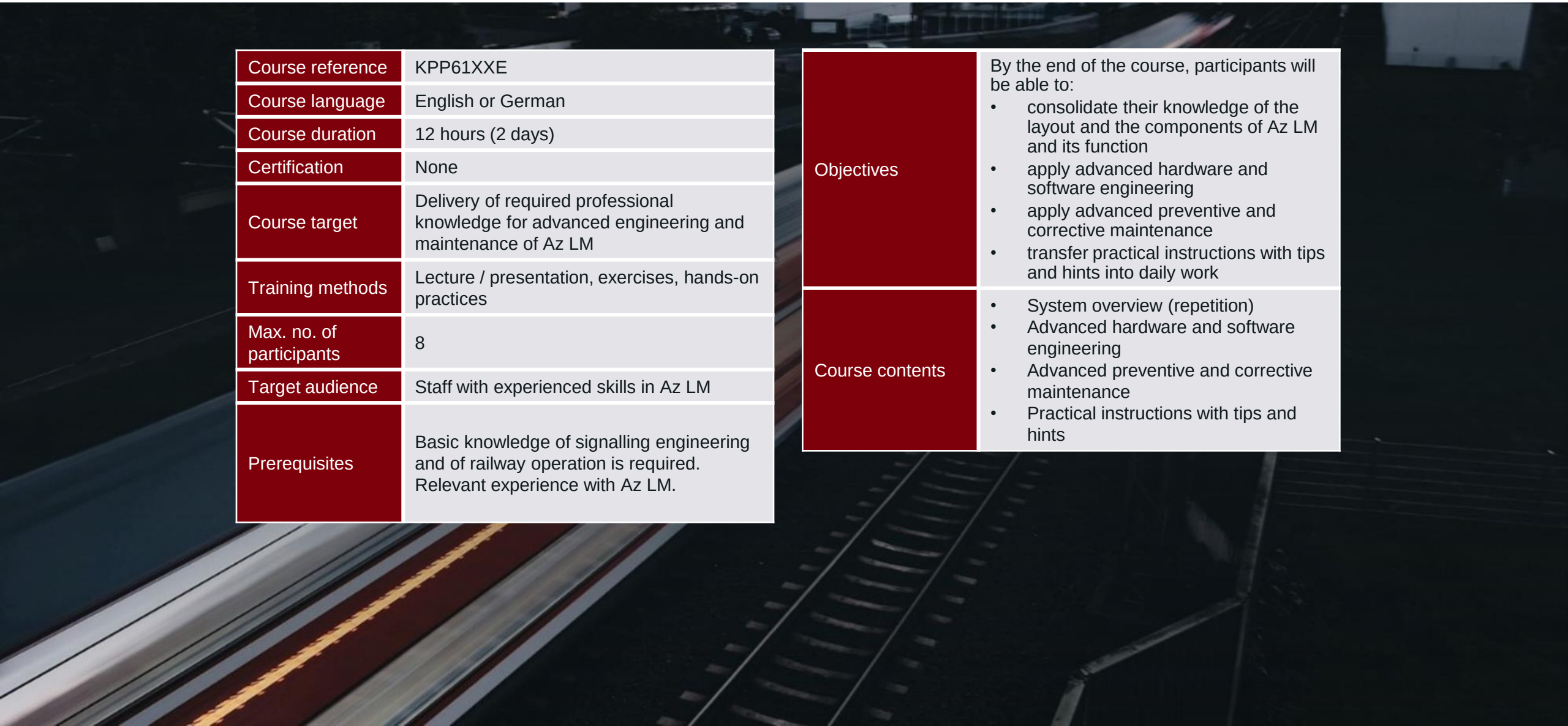

Course reference	KPP61XXE
Course language	English or German
Course duration	12 hours (2 days)
Certification	None
Course target	Delivery of required professional knowledge for advanced engineering and maintenance of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Staff with experienced skills in Az LM
Prerequisites	Basic knowledge of signalling engineering and of railway operation is required. Relevant experience with Az LM.

Objectives	By the end of the course, participants will be able to: • consolidate their knowledge of the layout and the components of Az LM and its function • apply advanced hardware and software engineering • apply advanced preventive and corrective maintenance • transfer practical instructions with tips and hints into daily work
Course contents	• System overview (repetition) • Advanced hardware and software engineering • Advanced preventive and corrective maintenance • Practical instructions with tips and hints

Az LM – Certified Expert

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Course reference	KPP6141E
Course language	English or German
Course duration	54 hours (9 days)
Certification	6 hours (1 day) written and hands-on examination
Course target	Delivery of required professional knowledge for installation, commissioning, maintenance, engineering, generation of application documentation and application data, as well as application approval of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	4
Target audience	Engineers who supervise personnel or projects and need thorough understanding
Prerequisites	Basic knowledge of signalling engineering and of railway operation is required. Advanced knowledge in using PC is required. Basic knowledge in using Linux operating systems and TCP/IP-Ethernet transmission is advantageous.

Objectives	By the end of the course, participants will be able to: • describe the layout and the components of Az LM and its function • understand operational and technical messages and analyze their causes • analyze safety application conditions and describe related use cases • carry out installation, commissioning, and maintenance • apply hardware and software engineering • create compact-flash-cards • check configurations and settings of the Az LM application on conformity with detailed design documents • apply advanced engineering and maintenance
Course contents	• Fundamentals • Installation and commissioning • Maintenance • Hardware and software engineering • Data preparation and data verification

Az LM – Certified Trainer

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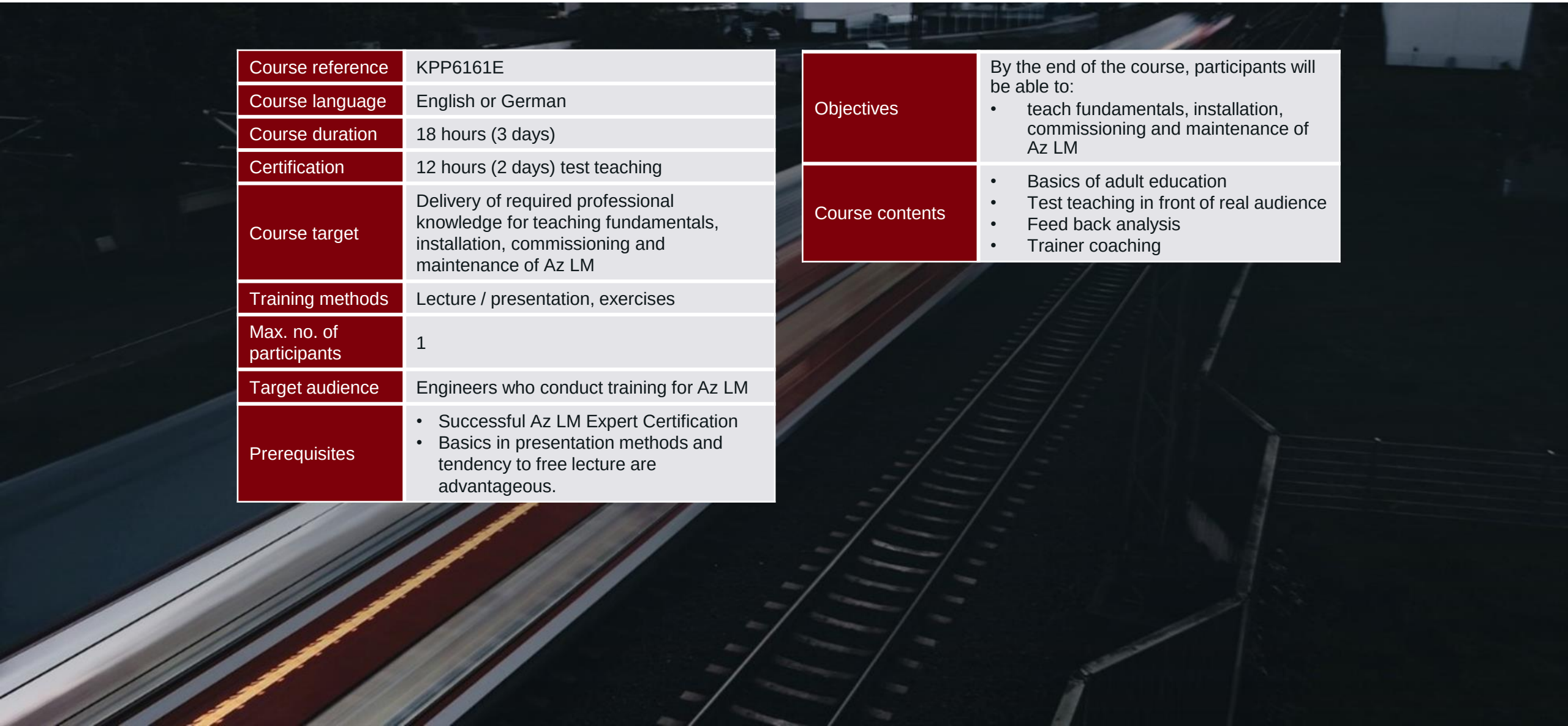

Course reference	KPP6161E
Course language	English or German
Course duration	18 hours (3 days)
Certification	12 hours (2 days) test teaching
Course target	Delivery of required professional knowledge for teaching fundamentals, installation, commissioning and maintenance of Az LM
Training methods	Lecture / presentation, exercises
Max. no. of participants	1
Target audience	Engineers who conduct training for Az LM
Prerequisites	• Successful Az LM Expert Certification • Basics in presentation methods and tendency to free lecture are advantageous.

Objectives	By the end of the course, participants will be able to: • teach fundamentals, installation, commissioning and maintenance of Az LM
Course contents	• Basics of adult education • Test teaching in front of real audience • Feed back analysis • Trainer coaching

Az LM – Recertification Courses / RoWE*

Course reference	KPP61XXE
Course language	English or German
Course duration	9 to 15 hours (1.5 to 2.5 days)
Certification	3 hours (0.5 days) written and hands-on examination
Course target	Delivery of required refreshed professional knowledge for installation, commissioning, maintenance, engineering, generation of application documentation and application data, as well as application approval of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Staff who need to refresh their Az LM knowledge
Prerequisites	Participation in the course “Az LM Certified Expert” or “Az LM Certified Trainer”

Objectives	By the end of the course, participants will be able to: • fulfill their required job tasks with the help of the refreshed AzLM knowledge
Course contents	Related to the specific recertification course

* RoWE: For other courses than “Az LM Certified Expert” or “Az LM Certified Trainer” recertification is performed by “Records of Work Experience” and online examination or telephone interview

Az LM – Upgrade Courses

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Course reference	KPP6128E
Course language	English or German
Course duration	15 hours (2.5 days)
Certification	None
Course target	Delivery of required upgraded professional knowledge for installation, commissioning, maintenance, engineering, generation of application documentation and application data, as well as application approval of Az LM
Training methods	Lecture / presentation, exercises, hands-on practices
Max. no. of participants	8
Target audience	Staff who need to upgrade their Az LM knowledge
Prerequisites	Participation in the course “Az LM Installation and Commissioning“ “Az LM Maintenance” “Az LM Installation, Commissioning, and Maintenance” “Az LM Engineering and Data Preparation” “Az LM Engineering and Data Verification” “Az LM Engineering, Data Preparation and Data Verification” “Az LM Certified Expert” or “Az LM Certified Trainer”

Objectives	By the end of the course, participants will be able to: • understand the difference between latest and previous releases • understand and apply changes in their job tasks due to the release changes
Course contents	Related to the specific upgrade course

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