

Digital Communication in Vehicles

Agenda VectorAcademy

Delivery Format:	This Course is offered in Remote Format
Duration:	18 hours
Target Group:	Newcomers, retrainers and transferors in the automotive sector
Prerequisites:	None
Goal:	Become familiar with the systems in automotive digital communication. Gain knowledge about their historical and technical characteristics. Understand basic principles, use cases and differences, and develop a sense of their characteristics and complexity. Converse insights into the automotive typical systems CAN, LIN, FlexRay and Automotive Ethernet for basic technical understanding.

1. Motivation, history & basic knowledge

- > Electronification in the automotive industry
- > Technology change - introduction to analog/digital conversion and number systems
- > Digital user information and transmission principles

2. Physical & Logical layer

- > Transmission media & topologies
- > Bitserial data transmission & interference effects
- > Data protection & error handling
- > Communication protocols, tasks, application areas and performance characteristics

3. Communication principles

- > Signal-Oriented Communication
- > Service-Oriented Communication

4. Summary

- > Profiles of CAN (FD), LIN, FlexRay, Automotive Ethernet
- > Things to know

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5. Insight into CAN

- > Use cases
- > Communication principle
- > Bus physics & practical knowledge
- > Essentials of the CAN (FD) protocol (ID, DLC, Data, ACK & Error Frames)

6. Insight into LIN

- > Use cases
- > Communication principle
- > Bus physics & practical knowledge
- > Essentials of the LIN protocol (versions, headers, response, message types, slave configuration)

7. Insight into FlexRay

- > Use cases
- > Communication principle
- > Bus physics & practical knowledge
- > Essentials of the FlexRay protocol (synchronization, communication cycle)

8. Insight into Automotive Ethernet

- > Use cases
- > Communication principle
- > Network physics & practical knowledge
- > Ethernet basic communication (OSI layers 1-4)
- > Brief overview of Automotive Ethernet application protocols (DoIP, AUTOSAR PDU, SOME/IP)

9. Miscellaneous

- > Exercises for certain chapters
- > Demo with CANoe/CANalyzer for certain topics
- > Feedback & Discussion