EXCENTIS trainings

2025 training portfolio

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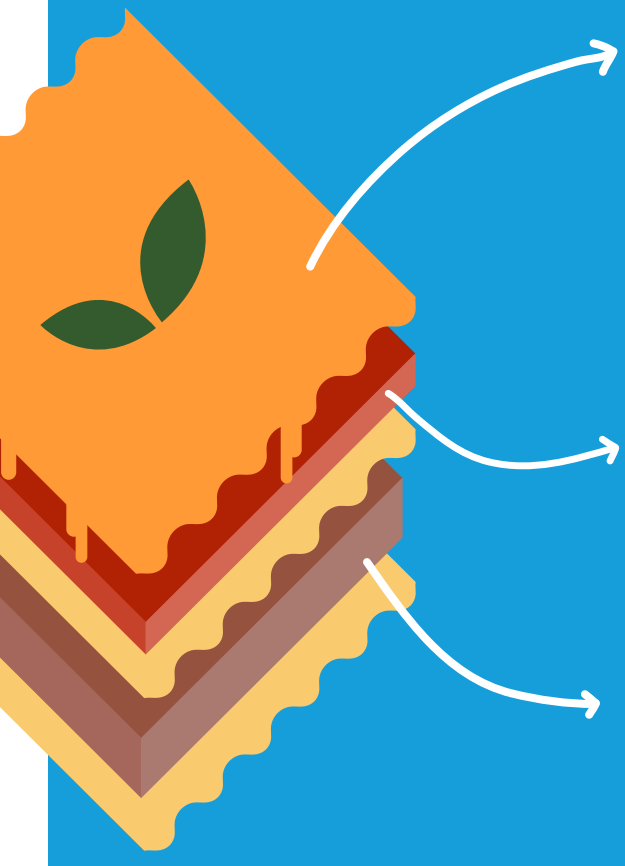
Did you know that Excentis training offers **tailor-made training solutions?**
Designed specifically for your company. Our training programs are fully customizable in terms of topics, structure, language, and group size, ensuring they meet your unique needs.

About EXCENTIS

Our mission is to advance today's networks while paving the way for tomorrow's. This commitment has established us as the go-to knowledge center for All Access Networks. Our proposal is thoughtfully constructed in layers (just like a lasagna) covering testing tools, services and outsourcing.



Outsourcing

Excentis can seamlessly step in wherever you need us. We are equipped to handle everything, from blueprint design to engineering, setup, and operations. Leverage Excentis' expertise and resources as if they were your own. Customize your solution by choosing the specialty, seniority, and capabilities that best suit your needs.

Learn more

Services

Providing testing, consultancy, and training for proactive and reactive solutions to address **all access networks** issues.

Learn more

Testing tools

Our tools generate traffic for troubleshooting and analysis, pinpoint and resolve issues, ensuring performance, functionality, and stability in labs and real-world scenarios.

Learn more

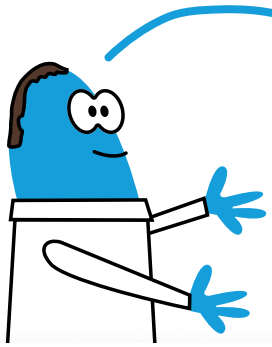
Any questions? Let's talk training@excentis.com

About **Excentis training**

About our expert trainers

Trainers with real-world experience as **engineers.**

Combines theory with **practical insights** and examples.



Hi Bart!

Meet Bart Neirynck our training manager! If you have any questions send him a direct email training@excentis.com

Practical knowledge includes **tips, current trends, and industry insights.**

We are an **independent partner** for unbiased training.

Interactive training sessions for better engagement and retention.

Post-course expert **support** for continued learning.

About the training

Customized **learning paths** based on job roles and prior knowledge.

Tailor-made workshops using **Excentis lab infrastructures.**

High retention through interaction, quizzes, Q&A, and practical exercises.

Boost efficiency: trainees gain deep understanding to configure, monitor, debug, and support.

Group discussions focused on real-world attendee challenges.

Training available for **all levels,** from beginner to advanced.

Includes a PDF syllabus and a **training certificate** by Excentis.

Expertise **levels**

We offer training for everyone, from Padawan to Jedi!

Beginner | Intermediate | Advanced

Learning **paths**

Network operations & support

Beginner

Cable technologies

Intermediate

Data communications & HFC

DOCSIS & Wi-Fi workshops

Wi-Fi

Wi-Fi 7

Wi-Fi refresh

Advanced

(Euro) DOCSIS technology and protocol level 1

(Euro) DOCSIS refresher

DOCSIS 3.1 Operations

DOCSIS & Wi-Fi workshops

PON

R&D and engineering

Beginner

Cable technologies

DataCommunications & HFC

(Euro) DOCSIS technology and protocol level 1

(Euro) DOCSIS Refresher

DOCSIS 3.1 Essentials

Intro EuroPacketCable

Wi-Fi

Wi-Fi refresh

DOCSIS - Wi-Fi Workshop

DOCSIS 4.0 workshop

Intermediate

Data (Euro) DOCSIS technology and protocol level 2

DOCSIS 3.1

DOCSIS 3.1 Refresher

DOCSIS 4.0

Distributed CCAP - R-PHY

eRouter

L2VPN

EuroPacketCable 2.0

Low Latency DOCSIS

Wi-Fi engineering

Wi-Fi 7

DOCSIS & Wi-Fi Workshop

PON

Advanced

DOCSIS Workshop Expert Modules

DOCSIS Wi-Fi Workshop

Project management

Beginner

Cable technologies

Data Communications & HFC

DOCSIS - Wi-Fi Workshop

Intermediate

Data (Euro) DOCSIS technology and protocol level 1

DOCSIS 3.1 Essentials

Intro EuroPacketCable

Wi-Fi

DOCSIS & Wi-Fi Workshop

Advanced

Distributed CCAP - R-PHY

eRouter

L2VPN

EuroPacketCable 2.0

DOCSIS & Wi-Fi Workshop

Training Courses

Cable Network Technologies

Beginner ◉○○	Learning path ●●●	Duration: 1 day	Prerequisites: none

Overview: HFC networks deliver multiple services via a single coaxial cable. This 1-day course provides an overview of HFC network elements and services offered by cable operators. It is designed for professionals in marketing, finance, operations, and project management needing basic cable network knowledge, as well as telecom beginners. Attendees will learn about HFC technologies and how services interact, gaining foundational insights into cable network operations without requiring a technical background.

General contents: Internet Protocol (IP), Optical Networking, EuroDOCSIS.

What to expect?

- Understand the basics of HFC network operation
- Learn about IP and its future
- Explore fiber optics in operator networks
- Gain insights into wireless communication
- Understand internet services over HFC
- Learn about telephony services over HFC
- Discover multimedia service delivery
- Understand TV (analog/digital) delivery over HFC
- Explore additional possible services

PON

Intermediate ◉◉○	Learning path ○●●	Duration: 2 day	Prerequisites: Understanding of telecom concepts

Overview: Optical communication via fiber optics remains key to high-speed broadband. To recognize its importance, we offer PON training. Our course covers all aspects of PON technology, with a focus on XGS-PON, including architecture, ONT/ONU provisioning, security, QoS, and management. It's an ideal starting point for those new to the technical and protocol aspects of PON.

General contents: Optical Communication, Fiber Optics, PON Training, XGS-PON, Network Provisioning

What to expect?

- Achieve a comprehensive understanding of the ideas behind the PON recommendations
- Understand the most important key issues and advantages of a PON deployment
- After attending this course, the attendee will be capable of understanding the PON architecture and concepts

Data Communications & HFC

Beginner ◉○○	Learning path ●●●	Duration: 0,5 day	Prerequisites: RF, basic electronics knowledge

Overview: HFC architecture is widely used by cable operators for internet, telephony, and multimedia services. This course explores the architecture and key components of an HFC network's return path (customer to headend). Attendees will gain insights into modulations, multiple access techniques, analogue-to-digital conversion, interference sources, their effects on communication signals, and mitigation strategies. It's ideal for those starting in cable (engineering, network operations, or management) seeking a solid foundation in HFC networks.

General contents: HFC, signals, noise, modulation, components.

What to expect?

- Understand the architecture of an HFC network.
- Knowledge of the performance of basic components in the return path of an HFC network.
- Understanding of sources of interference and of techniques to reduce interference.

Training Courses

(Euro)DOCSIS Technology and Protocol: Level 1

Beginner ◉○○	Learning path ●●●	Duration: 2 days	Prerequisites: Experience with RF and IP, basic electronics knowledge

Overview: (Euro)DOCSIS is the leading technology for broadband IP access in cable networks, enabling next-generation services like VoIP and video conferencing. Level 1 training covers (Euro)DOCSIS up to 3.1, including architecture, provisioning, security, QoS, and management. It's the perfect starting point for newcomers to technical (Euro)DOCSIS concepts and protocols.

General contents: EuroDOCSIS, QoS, channel bonding, security, modulation.

What to expect?

- Understand (Euro)DOCSIS specifications up to 3.1.
- Learn key issues and advantages of (Euro)DOCSIS in cable networks.
- Gain hands-on experience with Excentis' EuroDOCSIS certification testing.
- Master the (Euro)DOCSIS reference model and concepts.

(Euro)DOCSIS Technology and Protocol: Level 2

Intermediate ◉◉○	Learning path ●	Duration: 2 days	Prerequisites: Technology & Protocol Level 1

Overview: Level 2 training builds on Level 1, offering in-depth, example-driven content. It's designed for those seeking advanced knowledge beyond fundamentals. Topics include modem and CMTS configuration, monitoring, and troubleshooting, useful for working with vendors and operators. DOCSIS 3.1 is briefly covered; for deeper knowledge, specialized DOCSIS 3.1 courses are available.

General contents: DOCSIS, channel bonding, QoS, security, energy management, monitoring, multicast.

What to expect?

- Gain in-depth knowledge of (Euro)DOCSIS concepts, configuration, and monitoring.
- Understand key technology issues and learn to configure CM and CMTS.
- Develop troubleshooting skills and communicate effectively with vendors and operators.
- Benefit from hands-on experience with Excentis' EuroDOCSIS certification testing.

(Euro)DOCSIS Technology & Protocol Refresher

Intermediate ◉◉○	Learning path ●	Duration: 1 days	Prerequisites: Attended (Euro)DOCSIS Level 1 or similar knowledge

Overview: The (Euro)DOCSIS Technology & Protocol Refresher course refreshes in one day all fundamental aspects of the (Euro)DOCSIS technology up to DOCSIS 3.1.
This course is meant for people who can benefit from a quick refresher of the previous attended Level 1 course. Mainly prior to attending the Level 2, DOCSIS 3.1, DCA or L2VPN trainings it is worth considering this quick refresher of the (Euro)DOCSIS fundamentals.

General contents: DOCSIS, RF aspects, modem initialization, QoS, security.

What to expect?

- A good refreshment/recap of the (Euro)DOCSIS Technology & Protocol course Level 1.
- After attending this course, the attendee will have refreshed its understanding of the (Euro)DOCSIS reference model, concepts, key issues and advantages.

Training Courses

eRouter

Beginner ◉○○	Learning path ●●	Duration: 0,5 days	Prerequisites: Basic understanding of DOCSIS

Overview: Today, most operators deploy cable modems with embedded router and NAT functionality, a basic set of requirements for this type of devices is defined by eRouter. This course describes the different features that need to be supported by eRouter devices, this includes NAT, IPv6, DS-lite and others. Additionally, provisioning aspects of eRouter devices are also discussed.

General contents: eRouter, RFC6204, protocol stack, IPv4, IPv6, QoS, security, provisioning, TR-069, SNMP.

What to expect?

- Get insight into DOCSIS eRouter requirements.
- Benefit from hands-on experience of Excentis' EuroDOCSIS certification testing.

BSOD L2VPN

Intermediate ◉◉○	Learning path ●●	Duration: 0,5 days	Prerequisites: Basic understanding of DOCSIS

Overview: L2VPN is an optional part of the DOCSIS set of specifications. It provides possibilities for operators to deliver new services to business customers. This course provides an insight into the operation and configuration of the L2VPN technology. It is perfectly suited for engineers and operational people who need to have a thorough understanding of the issues and possibilities offered by the L2VPN DOCSIS technology.

General contents: Operator network, DOCSIS reference model, L2VPN, VLAN, MPLS, VPLS, L2TPv3, business services, multicast, QoS.

What to expect?

- Understand benefits and possibilities of DOCSIS L2VPN technology.
- Understand operation and configuration of L2VPN DOCSIS operation.

Intro EuroPacketCable
Intro EuroPacketCable 2.0

Expertise levels	Learning path	Duration: 2 days	Prerequisites:

What to expect?

More information on request, contact us.

Training Courses

DOCSIS 3.1 Essentials

Intermediate	Learning path	Duration:	Prerequisites:
◉◉○	●●	0,5 days	(Euro)DOCSIS level 1 and basic DOCSIS knowledge

Overview: DOCSIS 3.1 is the latest version of the DOCSIS set of specifications, promising download speeds of up to 10 Gbps. It defines a totally new physical layer for achieving those speeds. After attending this course, the attendee will be capable of understanding the essential DOCSIS 3.1 concepts.

General contents: Telecommunication systems, OFDM, DOCSIS 3.1, LDPC, BCH, profiles, downstream transmission, upstream transmission, CM initialization, transition.

What to expect?

- A quick and dense overview of the technological evolution and its advantages along with basic concepts introduced in DOCSIS 3.1.
- An overview of the different features and characteristics without providing the exact mechanisms.
- Understanding of the speeds that can be offered by 3.1 based on network parameters.

DOCSIS 3.1 Operations

Advanced	Learning path	Duration:	Prerequisites:
◉◉◉	●●	1 days	Attend (Euro)DOCSIS Level 1 or similar knowledge

Overview: DOCSIS 3.1 offers speeds up to 10 Gbps with a new physical layer, requiring significant HFC network upgrades. This training provides an operations-focused overview of DOCSIS 3.1, covering its fundamentals and operational monitoring. It's ideal for those responsible for network performance and supporting technical challenges.

General contents: Telecommunication systems, OFDM, DOCSIS 3.1, LDPC, profiles, cable modem initialization, downstream transmission, upstream transmission, Active Queue Management (AQM), operational concepts.

What to expect?

- Understand technological evolution and advantages in DOCSIS 3.1.
- Learn network performance expectations and efficiency improvements.
- Gain knowledge of DOCSIS 3.1 operational monitoring.
- Be capable of understanding DOCSIS 3.1 concepts and performing operational monitoring.

DOCSIS 3.1

Intermediate	Learning path	Duration:	Prerequisites:
◉◉○	●	2 days	Attend (Euro)DOCSIS level 1

Overview: DOCSIS 3.1 offers download speeds up to 10 Gbps with a new physical layer, requiring major HFC network upgrades. This engineering course provides insight into the new physical layer's operation, its impact on the network, and necessary modifications. It also covers achievable speeds based on network parameters. Prior DOCSIS knowledge is recommended.

General contents: OFDM, LDPC, downstream transmission, upstream transmission, cable modem initialization, profile promotion, Advanced Queue Management (AQM), Hierarchical QoS (HQoS), HFC network readiness.

What to expect?

- Understand the technological evolution and advantages of DOCSIS 3.1.
- Overview of key features and characteristics.
- Calculate achievable speeds based on network parameters.
- Gain knowledge of DOCSIS 3.1 concepts, numerology, configuration, and monitoring

Training Courses

Low Latency DOCSIS

Beginner ◉○○	Learning path ●	Duration: 0,5 days	Prerequisites: (Euro)DOCSIS level 1 and basic DOCSIS knowledge

Overview: The internet has grown significantly over the last 20 years, increasing the need for bandwidth. However, some services, like web meetings and online gaming, require low latency, not just bandwidth. Low Latency DOCSIS (LLD) in DOCSIS 3.1 ensures minimal latency (around 1ms) even under heavy load. This course covers LLD operation, service impact, and testing. Prior DOCSIS knowledge is recommended.

General contents: Lower latency, media access improvements, buffering, provisioning, deployment considerations, performance and reporting, lab tests.

What to expect?

- Achieve a good understanding of the benefits and challenges of LLD.
- After attending this course, the attendee will be capable of understanding DOCSIS 3.1 LLD concepts, configuration and testing

DOCSIS 3.1 Refresher

Advanced ◉◉◉	Learning path ●●	Duration: 1 days	Prerequisites: Attend (Euro)DOCSIS Level 1 or similar knowledge

Overview: The DOCSIS 3.1 Refresher course offers a half-day review of DOCSIS 3.1 fundamentals. Designed for those preparing for DOCSIS 4.0 training, it covers essential concepts needed to understand how DOCSIS 4.0 builds on 3.1. A solid understanding of DOCSIS is recommended to get the most out of this course.

General contents: Increased speeds, OFDM, Cable modem initialization, Profile management, Ranging and registration, Advanced Queue Management (AQM), Hierarchical QoS (HQoS), PKI signing changes, DOCSIS Low Latency, HFC network readiness.

What to expect?

- A good refreshment/recap of the DOCSIS 3.1 training.
- After attending this course, the attendee will have refreshed its understanding of the DOCSIS 3.1 concepts, key issues and advantages and is well prepared to start the DOCSIS 4.0 training.

DOCSIS 4.0

Intermediate ◉◉○	Learning path ●	Duration: 2 days	Prerequisites: Attend (Euro)DOCSIS level 1

Overview: DOCSIS 4.0 offers download speeds of 10 Gbps and 6 Gbps upstream, enabling multi-gigabit services like video conferencing, IoT, and virtual reality. This course provides insights into achieving these speeds, assessing use cases for HFC, CM, and CMTS roadmaps, and covers significant security changes. DOCSIS 3.1 knowledge is recommended.

General contents: FDX, FDD, spectrum extensions, CM initialization, PHY changes, interference mitigation, echo cancellation, BPI+ v2, Perfect Forward Secrecy, deployment options.

What to expect?

- Gain an in-depth understanding of the technological evolution and advantages of DOCSIS 4.0.
- Overview of different options, characteristics, and potential gains.
- After attending this course, the attendee will understand key DOCSIS 4.0 concepts, terminology, deployment options, and communication from CM and CMTS perspectives.

Training Courses

DOCSIS 4.0 essentials

Intermediate ◉◉○	Learning path ●	Duration: 0,5 days	Prerequisites: Attended the (Euro)DOCSIS Technology & Protocol Level 1 training or have basic DOCSIS knowledge

Overview: DOCSIS 4.0 enables 10 Gbps downstream and 6 Gbps upstream, supporting multi-gigabit services like video conferencing, IoT, and VR over HFC networks. This course explores its high symmetrical speeds and roadmap potential. Prior DOCSIS 3.1 knowledge is recommended via training or a refresher for full benefit.

General contents: DOCSIS 4.0, FDD, FDX, HFC, Deployment, Bandwidth, Upstream, Downstream, Network, Speeds.

What to expect?

- A quick and dense overview of the technological evolution and its advantages along with basic concepts introduced in DOCSIS 4.0.
- An overview of the different options, characteristics and potential gains.
- After attending this course the attendee will be capable of understanding the main DOCSIS 4.0 concepts, terminology and field deployment options.

Distributed CCAP architectures – R-PHY

Intermediate ◉◉○	Learning path ●●	Duration: 0,5 days	Prerequisites: HFC network and basics of (Euro)DOCSIS technology

Overview: As bandwidth needs grow, pressure on headend and HFC infrastructure increases. Distributed Access Architectures (DAA) decentralize CMTS/CCAP functionality to remote locations. This course explores DAA, Remote PHY, and Remote CCAP architectures, focusing on technical specifications over marketing, offering insight into why distributed architectures are increasingly vital.

General contents: Headend Evolution, Distributed CCAP Architectures, Remote PHY, Remote MACPHY, C-DOCSIS, Split-MAC, GCP Control Plane, R-DEPI, R-UEPI.

What to expect?

- Gain insights into remote cable architectures, including R-PHY and R-MAC-PHY advantages and challenges.
- Understand key protocols (GCP, R-DEPI/R-UEPI, R-DTI) and PTP time synchronization.
- Learn how to provision, monitor, and upgrade RPDs, add analog services via OOB, and compare R-PHY with R-MAC-PHY solutions.

Wi-Fi

Beginner ◉○○	Learning path ●●●	Duration: 1,5 days	Prerequisites: Understanding of Ethernet

Overview: Wi-Fi is essential, but common misunderstandings cause issues for customers and ISPs. This course covers Wi-Fi networks, standards like Wi-Fi 6, and technology trends. It provides insights into planning, deploying, and troubleshooting Wi-Fi, along with an understanding of current challenges and market developments to improve network performance and reliability.

General contents: Wireless Environment, 802.11, MIMO, Modulation, MAC Layer, Authentication, Encryption, WPA3, Throughput, Hotspot 2.0.

What to expect?

- Understand current Wi-Fi standards, their options, their performance and limiting factors.
- Wi-Fi 6 promises interesting improvements in latency, throughput, range, power consumption, but how do they work and achieve what is promised?
- Learn how to successfully plan and deploy a residential Wi-Fi network.
- Learn the basics of Wi-Fi troubleshooting

Training Courses

Wi-Fi refresher

Intermediate ◉◉○	Learning path	Duration: 0,5 days	Prerequisites: Previous Wi-Fi technologies

Overview: This course covers key Wi-Fi concepts, focusing on the latest Wi-Fi technologies, Wi-Fi 6 and Wi-Fi 6E (802.11ax). It's ideal for those who've previously trained in Wi-Fi but haven't yet learned about Wi-Fi 6 and 6E.

General contents: Introduction, Wireless, Environment, Physical Layer, MAC Layer, Security, Architectures, Troubleshooting, Tools, Wi-Fi.

What to expect?

- Clarifying myths around buzzwords like OFDMA, MIMO, MU-MIMO, and Security.
- Promised improvements in latency, throughput, range, and power consumption.
- Exploring how these features actually work
  The role of Wi-Fi 6E in the future of Wi-Fi.
- Differences in Wi-Fi 6E impact between Europe and the US.

Wi-Fi 7

Beginner ◉○○	Learning path ●	Duration: 0,5 days	Prerequisites: previous Wi-Fi technologies

Overview: Wi-Fi has become almost as essential as food, water and shelter. As many other technologies, Wi-Fi as well is in continuous improvement.

This course covers all concepts of the upcoming Wi-Fi technology, called Wi-Fi 7 or 802.11be. It is ideally suited for everyone who previously followed a Wi-Fi training including Wi-Fi 6/Wi-Fi 6E.

General contents: Higher throughput, Higher efficiency, Higher reliability, Lower latency, Multi-Link Operation (MLO), Multi-Link Devices (MLD), QoS, H-ARQ, Multi-AP.

What to expect?

- Promised speeds and how they're achieved (bands, channel sizes, modulations)
- Improving Wi-Fi efficiency (Multi-RUs, preamble puncturing, STA-to-STA exchange)
- Enhancing reliability (MLO, redundancy) & lowering latency (MLO, load balancing)
- MLO/MLD, QoS (traffic differentiation, Restricted Service Periods, QoS signaling)
- Wi-Fi 7 extras

Wi-Fi Hands-on

Intermediate ◉◉○	Learning path ●●	Duration: 1 day	Prerequisites: Understanding of Wi-Fi

Overview: This hands-on workshop provides exclusive access to Wi-Fi testing (stability, performance, features) at Excentis facilities. It's an ideal opportunity for those who have previously taken Wi-Fi training and want to apply their theoretical knowledge in a practical setting.

General contents: Analysis, Wi-Fi, Connections, Technology, Testing, Airtime fairness, Throughput, Roaming, Security, Feature support.

What to expect?

- Take captures and analyze the Wi-Fi communication between AP's and clients.
- Execute expert-led exercises such as validating airtime fairness, throughput, roaming, security, and other feature support.

Workshops

About our workshops

Based on a mutual **predefined scope** and time.

Custom workshop session with a group of people of the same company led by a subject expert.

Theory and/or **practical** focus.

General workshops

ByteBlower

test framework

Get the most out of your ByteBlower.

- **Customer centric** — Built primarily on clear test requirements provided by our MSO customers.
- **Flexible** — Open source and accessible and effective for both test developers and test engineers/executors.
- **Quick to set up and use** — Minimal boiler plate code needed to start and Fully built-in cases library.

Workshop

DOCSIS

Learn from the experts.

- **In-depth understanding** — Understand in-depth the processes that technicians and engineers handle on a daily basis.
- **Improve configurations** — Be able to provide valuable suggestions that truly optimize the process.
- **High performance** — Boost employee performance while saving valuable time and money.

Low latency workshop

Wi-Fi, PON, HFC, Cellular networks, Starlink

- **Why latency is important?** — Focus on latency for optimal performance for all-access networks.
- **Root causes of latency** — General en specific to each access network.
- **Measuring and comparing latency** — Gain practical experience and apply theory to practice.

Testimonials

"Training itself and the trainer was fantastic. The trainer explained the presentation very well and if we had a question he answered very clear. Great Workshop"

Hans-Jürgen Zinner, Magenta Telekom
HFC Access Architecture & Design Engineer

"This was one of the best training courses I've had so far. I was especially impressed by the level of knowledge of the trainer, no question was left unanswered. Looking forward to my next session from Excentis!"

Arjan Van der Vegt, Liberty Global
Sr. Manager Connectivity CPE

"Come as novice, leave as expert"

Sushant Shiromani, Liberty Global
CPE Engineering Manager

"Quickest path from zero to hero in DOCSIS engineering."

Meissam Ramazani, Sunrise GmbH
Access Network Engineer

"If you want to learn up to date and latest new trends and technologies with highly professional trainers then Excentis is the right place."

Dejan Vulin, Unitymedia
DOCSIS Specialist

Let's design together your next workshop

EXCENTIS
Tailor-made training & workshop

Learn more

Register today!

Groups | Tailor-made | R&D platforms

See our available training and workshops.

www.excentis.com/training