XCELERATE TRAINING INSTITUTE

your learning & development partner

TELECOMMUNICATION

Software Defined Radio (SDR) Course

DURATION	LANGUAGE	FORMAT
10 days	**English**	**Classroom / Online**

Upcoming dates

Dates	Venue	Format	Fee
1 – 12 Mar 2027	Live online	Online (live)	**€1,800**
13 – 24 Sep 2027	Live online	Online (live)	**€1,800**
11 – 22 Oct 2027	Barcelona	Classroom	**€5,400**

Register or ask a question

Online: x8ti.com/course/software-defined-radio-sdr-course/

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Software Defined Radio (SDR) Course

Introduction

Software Defined Radio (SDR) is a modern approach to radio communication that replaces traditional hardware components with software. This flexibility allows for customizable radio designs. This course will explore SDR's fundamentals, advantages over traditional radio, and its practical applications. By understanding analog signal processing, digital signal processing (DSP) techniques, and their interaction, participants will learn to create optimized software-based radio solutions. The course aims to develop a strong foundation in SDR, its global significance, and its practical implementation.

Learning Objectives

This SDR training program aims to provide technology professionals with:

- A comprehensive understanding of SDR's core concepts.
- The ability to train colleagues on SDR principles.
- The skills to position their organization as a leader in the SDR market.

Training Methodology

This course by Xcelerate Training Institute combines lectures, seminars, group discussions, assignments, and case studies to deliver a comprehensive learning experience. The training follows a practical approach emphasizing doing, reviewing, learning, and applying knowledge.

Benefits for Your Organisation

By enrolling employees in this SDR course, organizations can:

- Develop skilled professionals to implement and manage SDR effectively.
- Provide free ongoing training to improve efficiency.
- Streamline processes and enhance organizational growth.
- Gain a competitive edge in the SDR market.
- Apply advanced SDR techniques to improve operations.
- Increase customer satisfaction and reduce costs.

Benefits for You

Participants in this SDR course will:

- Develop a deep understanding of SDR technology.
- Gain expertise in advanced SDR techniques and concepts.
- Acquire the ability to implement and manage SDR successfully.
- Enhance problem-solving and decision-making skills.
- Advance their careers through increased knowledge and skills.
- Contribute to cost reduction and competitive advantage.

Who Should Attend

This course is suitable for:

- Senior management involved in technology decisions.
- Technical managers seeking cost-saving strategies.
- Telecom technology teams responsible for SDR implementation and maintenance.
- Managers and leaders looking to enhance their team's knowledge.
- End-users of SDR platforms seeking optimal utilization.
- Electrical, electronic, and telecommunication engineers interested in SDR fundamentals.

Course Outline

Introduction to SDR

What is Software Defined Radio?

- Definition and significance
- Evolution of radio technology

Key Concepts

- Signal processing fundamentals
- Analog vs. digital radio

SDR Architecture

- Functional blocks of an SDR system
- Overview of hardware and software components

SDR Hardware Components

Overview of SDR Hardware

- Types of SDR platforms (USRP, HackRF, RTL-SDR, etc.)
- RF front-end components

Antennas

- Types of antennas and their applications
- Antenna design basics

Interface and Connectivity

- USB, Ethernet, and other communication interfaces
- Power considerations

SDR Software and Tools

Software Platforms for SDR

- GNU Radio
- MATLAB and Simulink
- Other SDR software tools

Installation and Setup

- Installing GNU Radio and dependencies
- Configuring SDR hardware with software

Signal Processing Blocks

- Basic blocks (filters, modulators, demodulators)
- Creating flowgraphs in GNU Radio

Digital Signal Processing (DSP) Fundamentals

Introduction to DSP

- Sampling theory
- Quantization and encoding

Signal Analysis Techniques

- Time-domain and frequency-domain analysis
- Fast Fourier Transform (FFT)

Filtering Techniques

- FIR and IIR filters
- Designing and implementing filters in SDR

Modulation and Demodulation Techniques

Digital Modulation Schemes

- ASK, FSK, PSK, QAM
- Trade-offs and applications

Implementing Modulation/Demodulation

- Practical exercises using GNU Radio
- Real-time signal visualization

Advanced SDR Applications

Spectrum Sensing and Analysis

- Techniques for detecting signals
- Spectrum management applications

Software Defined Radio in Telecommunications

- Cellular systems, Wi-Fi, and IoT

SDR in Security and Defense

- Signal intelligence (SIGINT)
- Applications in military and emergency services

Practical Hands-On Projects

Building a Simple SDR Receiver

- Step-by-step construction
- Troubleshooting common issues

Implementing a Communication System

- Design and test a basic transmitter/receiver pair

Custom Applications

- Participants propose and develop their own SDR projects

Future Trends in SDR

The Role of AI and Machine Learning

- Integrating AI with SDR systems

Emerging Technologies

- 5G and beyond
- Cognitive radio concepts

Ethical and Regulatory Considerations

- Spectrum regulations and compliance
- Ethical implications of SDR technology

Copyright and intellectual property
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Registration Form

Software Defined Radio (SDR) Course

Preferred dates: ..... Venue or online: .....

Duration: 10 days Language: .....

Please complete and email this form to us, or register online. We confirm your place and send the invoice within one working day.

Delegate information

Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

Official email: ..... Personal email: .....

Company information

Company name: .....

Address: .....

City / country: ..... VAT / tax number: .....

Person responsible for training & development

Full name (Mr / Ms / Dr / Eng): .....

Position: ..... Telephone / mobile: .....

Email: .....

Payment

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Signature: ..... Date: .....

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Email this form
info@x8ti.com

Register online
Open the course page