# LTE Advanced

Only shortly after the advents of the first commercial LTE networks all over the world the mobile industry pushes the limits still further and already demonstrates in field tests that data rates above 1 Gbit/s are possible. This course enables you to keep up with the development of mobile technology and to shape actively the fascinating mobile business. Particularly you will get a deeper insight in the technological challenges which have to be faced in LTE Advanced. The course deals with the key features like carrier aggregation, enhancements of Multiple Antenna Techniques which boost the data rate above 1 Gbit/s as well as the heterogeneous network structure which is an attractive means to build cost efficient networks. This course covers also in detail the self-organizing network features which become increasingly mature and support the network operators in improving the network performance and saving operation expenditures. The course concludes with an outlook on the further development steps of LTE Advanced.

## Target Group/ Requirements

This course is addressed to leading technologists and experts who are at the forefront of the technological development of mobile networks as well as for decision makers who need a deeper insight into the technological challenges of mobile networks of the next years. Good knowledge of LTE is a prerequisite.

## Course Content

**Introduction**

- Key Features of LTE
- IMT Advanced: Requirements for the 4th Generation
- 3GPP Requirements for LTE Advanced
- The Key-Features of LTE Advanced

**Carrier Aggregation**

- Spectrum for LTE
- Protocols for Carrier Aggregation
- Downlink Control Signaling
- Cross-Carrier Scheduling
- Uplink Control Signaling
- Channel State Information
- UE Transmitter and Receiver Aspects

**Multiple Antenna Techniques**

- Downlink Reference Signals

**Duration:**
2 days

**Course number:**
NW1249

**Prerequisites:**
Good knowledge of LTE

- Uplink Reference Signals
- Enhanced Downlink MIMO
- Uplink MIMO

**Multimedia Broadcast Multicast Services**

- MBMS Network Architecture
- MBMS Single Frequency Network
- Protocol Structure and Signaling

**Heterogeneous Networks**

- Home eNodeB Architecture
- Challenges of Heterogeneous Networks
- Advanced Interference Management

**Range Expansion with Relay Nodes**

- Relay Architecture Overview
- The new Un Backhaul Interface
- Random Access on the Backhaul Link
- Security Aspects

**UE Positioning**

- Assisted Global Navigation Satellite System Positioning
- Observed Time Difference Of Arrival Positioning
- Cell-ID based Positioning

**Self-Organizing Networks**

- Inter-Cell Interference Coordination
- Automatic Neighbour Relation
- Load Balancing
- Mobility Robustness Optimization
- Minimization of Drive Tests

**Outlook**

- Coordinated Multipoint Transmission
- Cognitive Radio
- Direct Device Device Communication
- Machine Type Communication

## Certification

Certificates are given to all participants at the end of the course about the successful completion.

## Course Registration:

Please contact us via

- phone: +49 89 1894354-405
- email: training@tfk-technologies.de or
- via our website https://skilleap.com/courses

You will receive a confirmation of your registration. We can also advice you concerning the best combination of course contents.

For clients with special requirements the optimal training concept can be customized. Modules from our training portfolio can be combined to meet your company-specific needs.