

## Advance Satellite Communication Systems

*Cairo (Egypt)*

*18 - 22 May 2025*

UK Traininig

# PARTNER



# Advance Satellite Communication Systems

Code: GC28 From: 18 - 22 May 2025 City: Cairo (Egypt) Fees: 4000 Pound

## Introduction

In an era of rapid technological advancement, satellite communication systems stand at the forefront of innovation, enabling global connectivity across vast distances. This comprehensive course delves into the cutting-edge technologies and methodologies driving the evolution of advanced satellite communication systems. Participants will explore the latest developments in satellite communication devices, satellite design, communication protocols, signal processing, and network architectures. Combining theoretical insights and practical applications, this course is designed to equip professionals with the knowledge and skills necessary to navigate the complexities of modern satellite communication systems.

## Course Objectives

- Gain a comprehensive understanding of the fundamental principles and concepts underlying advanced satellite communication systems.
- Explore the latest advancements in satellite technology, including next-generation satellite communication solutions, satellite design, propulsion systems, and power management.
- Learn about advanced communication protocols and modulation techniques used in satellite communication systems.
- Understand the principles of satellite signal processing, including error correction coding and modulation schemes.
- Explore the design and implementation of satellite networks, including inter-satellite links and ground station configurations.
- Develop proficiency in analyzing and troubleshooting complex satellite communication systems.

## Course Outlines

### Day 1: Fundamentals of Satellite Communication Systems

- Introduction to satellite communication: history, evolution, and significance.
- Basics of satellite orbits and constellations.
- Satellite subsystems: payload, propulsion, power, and attitude control.
- Overview of satellite link budget analysis.

### Day 2: Advanced Satellite Technologies

- Next-generation satellite design: miniaturization, modularization, and reconfigurability.
- Advanced propulsion systems for satellite maneuverability and orbit control.
- Power generation and management in space.
- Satellite antennas: types, characteristics, and deployment considerations.



### Day 3: Communication Protocols and Modulation Techniques

- Overview of communication protocols in satellite systems: TDMA, CDMA, FDMA.
- Advanced modulation techniques: QPSK, 8PSK, QAM.
- Forward Error Correction FEC coding for error detection and correction.
- Adaptive coding and modulation ACM for dynamic link adaptation.

### Day 4: Satellite Signal Processing

- Satellite signal propagation: path loss, atmospheric effects, and noise.
- Digital modulation and demodulation techniques.
- Error correction coding: convolutional codes, Reed-Solomon codes, turbo codes.
- Carrier recovery and synchronization in satellite communication.

### Day 5: Satellite Networks and System Integration

- Design principles of satellite networks: GEO, MEO, and LEO constellations.
- Inter-satellite links ISLs and satellite-ground station communication.
- Ground station configuration and operation.
- Case studies and practical exercises in satellite system design and optimization.

### Conclusion

By the end of this course, participants will have gained an in-depth understanding of satellite communication technologies, including the principles of satellite communication, cutting-edge satellite communication solutions, and the latest advancements in satellite communication devices. Participants will also develop the skills to troubleshoot and optimize advanced satellite communication systems, positioning themselves as experts in this rapidly evolving field.





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