

DEAC-MSG-515 Telecommunications for Smart Grids

Syllabus

Chapter 1. Introduction

- 1.1 Telecommunication Challenges in Smart Grids
- 1.2 Smart Grids' main services: AMI, Distributed Automation, Distributed Generation, Demand Response, Security

Chapter 2. Digital Transmission Technologies

- 2.1 Digital Modulation.
- 2.2 Orthogonal Frequency Division Multiplexing.
- 2.3 Channel Coding.
- 2.4 Multiple Access Techniques.
- 2.5 Fundamentals of Digital Optical Communications.

Chapter 3. Transport Technologies

- 3.1 TDM: PDH, SDH, SONET
- 3.2 WDM Systems
- 3.3 Radio-frequency technologies.

Chapter 4. Switching Technologies

- 4.1 Routing Basics
- 4.2 Legacy example: Distance Vector
- 4.3 MPLS.

Chapter 5. Distribution Technologies

- 5.1 Wired: PLC (NB and BB), xDSL, FTTx, GPON
- 5.2 Wireless: WiMAX, Bluetooth, Zigbee, Cellular Communications

Chapter 6. Telecommunication Architecture for the Smart Grid

- 6.1 Network Architecture
- 6.2 Access Network
- 6.3 Core Network
- 6.4 Reliability and Security

Chapter 7. Technologies Enabling the Smart Grid

- 7.1 PRIME: PHY, MAC and LLC

7.2 Analysis of other standards: G3-PLC, IEEE1901, M&M, G.hnem.

Chapter 8. Practical examples

- 8.1 Telecommunication design case.
- 8.2 Testbed Practical sessions