

4/4 B.Tech - EIGHTH SEMESTER

EC 8T3C

Digital TV Fundamentals

Credits: 4

Lecture : 4 periods/week

Tutorial: 1 period /week

Internal assessment: 30 marks

Semester end examination: 70 marks

Course Objectives:

- Provide Background for understanding the Digital TV
- Understand the core technologies in digital TV Transmission i.e. Compression, Coding, and Modulation.
- Understand the test and measurements in Digital TV.
- Provide emphasis on advanced DTV.

Learning Outcomes:

- Students will know the building blocks of digital television and understand the technical solutions used to provide digital television .
- Students will be capable of analysing performance of television systems, doing elementary broadcast network planning.
- Enumerate the fundamental basics of modulation schemes, design issues and testing procedures of digital television.

UNIT-I

Introduction to DTV: What's DTV?, Overview of DTV Industry, ATSC Terrestrial Transmission Standard, Vestigial Sideband Transmission, DVB-T Transmission Standard, ISDB-T Transmission Standard.

UNIT-II

Digital Video: Video Fundamentals-Video Resolution, Progressive Vs Interlace, Aspect Ratio, Color space. Digital Video Compression-Compression Standards, The Basic Concept, Spatial Concept, Temporal Coding, Profile and Level, MPEG 4.

UNIT-III

Digital Audio: MPEG-I layer I, II, III, Dolby AC3, AAC

UNIT-IV

System Layer: ES (Elementary Stream) vs. PES (Packetized Elementary Stream), TS (Transport Stream) vs. PS (Program Stream), PSI vs. PSIP

UNIT-V

Transmission System: Channel Coding, Digital Modulation (Satellite, Cable, Terrestrial)

UNIT-VI

Terminal System: Digital Set-top box architecture, Embedded System design, Embedded System Programming, RTOS

UNIT-VII

Test and Measurement for Digital Television: Power measurements, average power measurement, calorimetry, power meters, peak power measurements, measurement uncertainty, testing digital television transmitters

UNIT-VIII

Advanced DTV: Conditional Access, MHP (Multimedia Home Platform), PVR (Personal Video Recorder), TVoC (TV on Chip)

Learning Resources

Text Books:

1. Digital Television: A Practical Guide for Engineers, Walter Fischer and H. von Renouard, Springer-Verlag, 2004
2. DTV: The Revolution in Digital Video; Jerry Whitaker, Mc Graw Hill, 3rd edition, 2001

References:

1. Digital Television Fundamentals; Michael Robin and Michel Poulin, Mc Graw Hill ,2nd Edition, 2000
2. Digital Video and HDTV Algorithms and Interfaces, Charles Poynton, Morgan Kaufmann Publishers, 2nd Edition, 2012.