





Course Schedule

<p>Week 1</p>	<ul style="list-style-type: none"> • Overview of Analogue TV and the transition to Digital Terrestrial Television Broadcasting (DTTB) <ul style="list-style-type: none"> ○ Analogue TV Technology and Standards: A recap ○ Digital Television –DTV; Basics of DTV, DTV model ○ DTV benefits: consumers, broadcasters and policy makers perspectives ○ Baseband signal for DTV, ○ Systems or Forms of DTV and Standards ○ Digital Terrestrial Television Broadcasting (DTTB) standards ○ Overview of DTTB standards ATSC, ISBD and DVB-T ○ Resolution and frame rates ○ HDTV, UHDTV • Discussion/ Chat session
<p>Week 2</p>	<ul style="list-style-type: none"> • Frequency Spectrum and its Management for DTTB <ul style="list-style-type: none"> ○ Radio spectrum management Issues for DTTB ○ Spectrum efficiency and DTTB ○ Single Frequency Networks ○ Digital dividend ○ Transmission path • Discussion/ Chat session
<p>Week 3</p>	<ul style="list-style-type: none"> • Core Technologies for Digital Terrestrial TV - Core Technology 1: Compression Technologies <ul style="list-style-type: none"> ○ Audio & Video compression theory, underlying concepts ○ Spatial, temporal and statistical redundancy ○ Types of compression ○ Basic interlacing and progressive scanning ○ Group of pictures (GOP) and I-, B- and P-frames ○ Understanding macro blocks, slices and frame ordering ○ Predictive coding and motion compensation ○ Motion vectors, discrete cosine transform (DCT) and entropy coding ○ Pre-processing and building efficient compression systems ○ Creating bit streams and multiplexing ○ MPEG-1, 2, 4, profiles and levels, transport streams ○ H.264, AVC, SVC, and evolutions ○ Multiplexing, data framing • Discussion and Quiz-1
<p>Week 4</p>	<ul style="list-style-type: none"> • Core Technology 2: Source and Channel Coding Techniques <ul style="list-style-type: none"> ○ Forward Error Correction - FEC methods ○ Need for FEC ○ Reed Solomon (RS), Convolutional codes, Viterbi decoding ○ Bit Interleaving, inner interleaver, outer interleaver ○ Statistical Multiplexing • Core Technology 3: Advanced Modulation Techniques <ul style="list-style-type: none"> ○ Orthogonal Frequency Division Multiplexing - OFDM ○ Multi-path immunity, multi carriers ○ Quadrature Amplitude Modulation - QAM

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	<ul style="list-style-type: none"> o Radio frequency carries systems, QPSK, 8-PSK, BPSK o Trellis encoding o Single frequency networks (SFN), multi frequency networks (MFN) o Rotated constellations • Discussion/ Chat session
Week 5	<ul style="list-style-type: none"> • Migration to DTTB: The technical aspects <ul style="list-style-type: none"> o Key elements in the digital terrestrial Television network and their functionalities o Digital terrestrial TV network planning and how it differs from analogue planning o Changes necessary in the existing analogue TV network for migrating to DTTB o Examples of digital TV networks in practice o Cost considerations • Discussion/ Chat session
Week 6	<ul style="list-style-type: none"> • Next Generation DTTB Technologies <ul style="list-style-type: none"> o Digital Video Broadcasting – Terrestrial- second generation; DVB-T2 o Improvements from DVB-T1 o Interactive services o Set-top-boxes o MHEG5, Multi-media Home Platform – MHP/GEM o Multiple inputs and single output for second generation MISO • Conclusion and Course Summary • Discussion, Quiz-2 & Evaluation of Training

Methodology

- o **Course materials:** Each week one module will be discussed and the relevant course material will be made available on the website on weekly basis.
- o **Discussion Forums:** Participants are expected to participate actively in discussion forums on selected topics throughout the week.
- o **Chat sessions:** Chat sessions will be conducted real time every week where discussions would be held with the instructor on a particular topic. Participants are encouraged to join the discussion and exchange points of view.
- o **Quizzes:** Two mandatory quizzes will be held during the course

Tutor

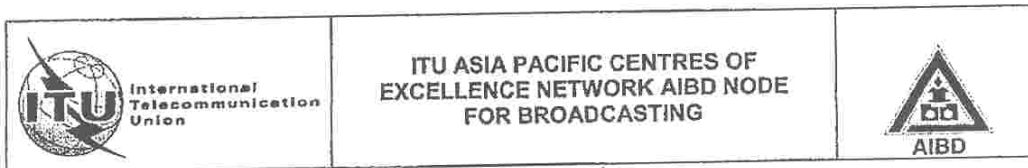
The course will be tutored by Mr Amal Dilantha Punchihewa. <G.A.Punchihewa@massey.ac.nz>, <amal.dilantha@xtra.co.nz>

Course Coordination

The course will be coordinated by Padarabinda Das (das@aibd.org.my) and Mr. Ashish Narayan (ashish.narayan@itu.int)

Participation fees

The ITU/BDT with the kind support from Asia-Pacific Institute for Broadcasting Development (AIBD) is offering this course free of charge to participants. Nevertheless the participants (or their entities) will have to cover their own internet access costs for participation.



Registration

Application to participate in this course should be made at <http://academy.itu.int> by following the steps:

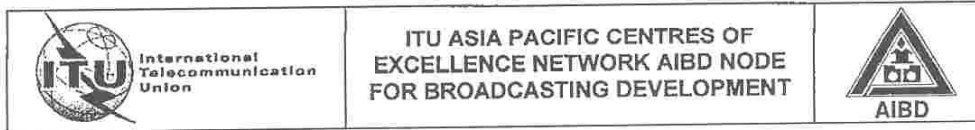
Step 1: Create a new account on the ITU Academy by clicking on Create new account in the section Login on the right. After completing the registration form, a message will be sent to your e-mail address with detailed information and with link to complete the registration to the ITU Academy.

Step 2: After having registered by using the link sent to your e-mail address, click on the Course button. Please note that to continue you have to be logged in. To log in to the ITU Academy, use the Login link available on the top of your screen.

Step 3: When you are logged in, you will come back to Course Categories. Continue to Technologies and Services and choose Digital Terrestrial Television Broadcasting Technologies, the title of the course.

Step 4: When the new window appears, please use this code to access the website of the online exchange: **10cASP116811**

Please note that online registration should be done **before 20 September 2010**. The course coordinator will confirm the acceptance of the candidates and will supply with the relevant instructions for participation.



**e-Learning Course:
"DIGITAL TERRESTRIAL TELEVISION BROADCASTING TECHNOLOGIES"**

STUDY PLAN

1.0 Course Dates And Duration

4 October to 14 November 2010 (6 Weeks)

2.0 Course Tutor/Instructors

Dr. Amal Punchihewa
School of Engineering and Advanced Technology
Massey University
Tennent Drive, Palmerston North.
New Zealand 4442.
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3.0 Course Synopsis

This course is designed for officials dealing with the planning, implementation and maintenance of Digital TV broadcasting stations. Over the six weeks course, the participant would gain an understanding of Overview of Digital TV; Spectrum Planning and Management; Compression Technologies; Advanced Coding Techniques; Advanced Modulation Techniques and Next Generation DTTB Technologies.

The course envisages active contribution of participants in weekly discussions as they form the requisite tools to apply the knowledge accorded in the learning materials. Together with the contributions made, quizzes and assignments will also be held to evaluate participant's success.

4.0 Target Population

Broadcasting and Telecom professionals from ITU and AIBD Members with engineering background and associated with the planning, implementation and maintenance of Digital TV broadcasting stations in their countries.

5.0 Course Objectives

- The course will enable participants to understand
- o the basics of digital television broadcasting,
 - o the terrestrial TV standards, formats and systems,
 - o the core technologies involved in digital terrestrial TV transmission: Compression, Coding and modulation techniques
 - o the fundamentals of frequency spectrum planning issues in DTTB
 - o the broadcast network planning issues