1. Module details

Module name

Television Basics

Module duration

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 18 - 20 hours.

Module code

NUE415

Discipline code

0703230

2. Module purpose

This provides students with a basic overview of TV broadcasting and reception together with the knowledge of television receivers to a block diagram level.

3. Prerequisites

Communications Fundamentals NE39

4. Relationship to competency standards

This module provides some of the knowledge and skills underpinning competence in the following standards: Metals and Engineering Industry National Competency Standards, Units 18.45A, 18.56A, 18.65A. National Electrotechnology Industry Standards, Units NES205, NES302, NES303, NES305, NES306, NES402, NES403, NES406, NES407.

5. Content

Broadcast TV System
Block diagram
Channel allocation (RF bandwidth, carrier frequencies)
Australian Standards

Transmitter
Block diagram of a television transmitter.

Camera
Scanning principles
Synchronisation
Video signal

Receiver
Simplified block diagram of typical television receiver

TV picture tube
Principles of operation

VHF and UHF signal propagation and distribution
Signal levels
Test equipment
Test patterns

Safety
High voltages
Manual handling

6. Assessment strategy

Assessment methods

Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. To assist in ensuring validity, reliability and fairness assessment instruments should include practical exercises, assignments and written tests consisting of a number of item types, such as multiple choice, short answer and problem solving.

Conditions of assessment

Normally learning and assessment will take place in a formal environment learning that is conducive to learning.

7. Learning outcome details

Learning outcome 1

Draw the fundamental block diagram of the Australian broadcast television system.

Assessment criteria

1.1 Sketch and label a blank block diagram of a basic television transmission system.

1.2 Sketch the signals at the input or output of each block in the television system block diagram, in the time and/or frequency domain (where appropriate) when the system is processing a grey scale step test pattern.

1.3 List the Australian standards for:
frame and line rates
- sub-carrier frequencies
- RF channel bandwidth (UHF and VHF)
- IF
- local station carrier frequencies.

Learning outcome 2

Describe the operation of a television camera.

Assessment criteria

2.1 Sketch a simplified diagram of a single tube, a three tube and a charge coupled device (CCD) camera labelling important functional parts.

2.2 Briefly describe the principles of operation of CCD camera.

	2.3 Sketch and describe the scanning process in a television camera.
	2.4 Describe the need for synchronisation.
	2.5 Sketch one line of video information from a monochrome camera tube identifying the line sync period.
	2.6 Sketch one frame of video information from a monochrome camera tube identifying the field synchronisation periods.
Learning outcome 3	Describe the operation of a television receiver
Assessment criteria	3.1 Draw the simplified block diagram of a typical analogue television receiver.
	3.2 Briefly state the purpose of each functional block.
	3.3 Sketch a simplified diagram of a colour cathode ray television picture tube and a liquid crystal display monitor.
	3.4 Sketch the input and output waveforms of each functional block (where appropriate) for an analogue television receiver under service conditions.
Learning outcome 4	State the principle of operation of picture tubes.
	4.1 Describe the function of the main tube components.
	4.2 Sketch a three gun colour picture tube labelling all major functional parts.
	4.3 Briefly describe the operation of the tube.
	4.4 Describe the scanning process when applied to a television picture tube and a liquid crystal monitor.
	4.5 Describe the need for synchronisation when scanning a raster.
Learning outcome 5	Describe the basic principles VHF and UHF signal propagation and distribution.

	5.1 Sketch typical drive waveforms to the electrodes of a Television picture tube when processing a colour bar test pattern. 5.2 Use a range of test equipment to identify typical signals in all major functional blocks of a receiver. 5.3 Identify and use a range of test patterns used for fault diagnosis in a television receiver.
Learning Outcome 6	Describe the relevant procedures for safe handling of picture tubes.
Assessment criteria	6.1 Describe the correct methods for manual handling of television picture tubes and LCD displays. 6.2 Compare typical electrode voltages in a colour cathode ray picture tube with a typical liquid crystal display monitor voltage. 6.3 State the typical voltage level found in a television EHT section. 6.4 List safety precautions, which must be observed when working with picture tubes.

8. Delivery of the module

Delivery strategy	Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module purpose. It is considered that the most effective way to achieve this is by the integration of theory and practice where students learn by experimentation and through research and laboratory reports. It is recommended that learning and assessment be facilitated in a holistic manner, which may require a learning outcome sequence other than that indicated in the module.
Resource requirements	Resources should be sufficient for students to carry out practical exercises on an individual basis. This will require a range of television receivers and test equipment. Useful references include: Ibrahim KF 1994, *Television Receivers.* Longman Essex, England ISBN 0-582-082-086175

	Liff A et al 1993, *Colour and Black and White Television* Prentice Hall, Englewood Cliffs ISBN 0-13-150012-0 Zarach et al 1985, *Television: Principles and Practice* MacMillan, Hampshire ISBN 0-333-19221-4 Where this module is used in an approved Traineeship or Apprenticeship program learners should be advised to obtain, where available, respective EE-Oz Training Standards[1] ***User Guides*** (*these outline in detail what training and work performance the Learner is required to undertake for the program*).
Occupational health and safety requirements	A safe and healthy environment will be provided for students and teachers as well as safety procedure with regard to learning / teaching activities.

[1] EEQSBA – ElectroComms and EnergyUtilities Qualifications Standards Body of Australia Ltd trading as EE-Oz Training Standards (www.ee-oz.com.au)