

1. Module details**Module name****Display Devices****Module duration**

It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 – 40 hours.

Module code

NUE105

Discipline code

0703230

2. Module purpose

The purpose of this module is to enable students to explain the operation of various display devices, perform appropriate measurements and demonstrate safe working procedures.

3. Prerequisites

NUE101 Introduction to TV.
NUE103 Scanning & Deflection.

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**Picture tubes**

types
construction
operational principles
adjustments
drive voltages and waveforms
safety
disposal
EHT voltage measurement
tube rejuvenation and testing

LCD displays

types
construction
principles of operation
scanning techniques
drive voltages and waveforms

Other display devices

plasma
light emitting plastics

Special display types

aspect ratios
HDTV

Projection techniques

front projection
rear projection
3 tube
single light source
LCD projectors

6. Assessment strategy

Assessment methods

Assessment should be progressive reflecting an 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 classroom / laboratory environment.

7. Learning outcome details

Learning outcome 1

Describe the detailed operation of the following types of colour picture tubes: delta, inline, precision inline gun and Trinitron.

Assessment criteria

- 1.1 Describe the construction of each type of colour picture tube.
- 1.2 Describe the operating characteristics of each type of picture tube.
- 1.3 List the advantages and disadvantages of each type of picture tube.
- 1.4 State typical electrode voltages for each type of picture tube.
- 1.5 Identify the correct type pins for voltage measurement from a circuit diagram.

Learning outcome 2

Demonstrate safe working procedures for picture tubes.

Assessment criteria

- 2.1 State the dangers of high voltage electric shock.
- 2.2 Demonstrate a safe method of measuring EHT.
- 2.3 Demonstrate a safe method of discharging a picture tube.
- 2.4 Demonstrate a safe method of handling a picture tube.
- 2.5 Describe a safe method of picture tube disposal.
- 2.6 Describe safe methods of transportation and storage of picture tubes.

Learning outcome 3

Demonstrate appropriate set up and adjustment procedures for colour picture tubes.

Assessment criteria

- 3.1 Describe the symptoms of a purity error and list possible causes.
- 3.2 Explain the need for de-gaussing.
- 3.3 Describe the operation of automatic de-gaussing circuitry.
- 3.4 Perform a manual de-gaussing procedure.
- 3.5 Perform purity adjustments.
- 3.6 Describe white field uniformity.
- 3.7 Describe the symptoms of a convergence error and list possible causes.
- 3.8 Perform convergence adjustments.
- 3.9 Perform focus and G2 adjustment.
- 3.10 Perform a grey scale adjustment.
- 3.11 Replace or set up a picture tube.

Learning outcome 4

Describe faults associated with picture tubes.

Assessment criteria

- 4.1 Describe symptoms of a low emission gun.
- 4.2 Describe symptoms of short or open circuits in a picture tube.

Learning outcome 5

Assessment criteria

4.3 Use a tube tester to ascertain the electrical condition of various picture tubes.

4.4 Describe methods of tube rejuvenation and restoration.

Describe operating characteristics of LCD displays.

5.1 Describe the operation of LCD displays.

5.2 Describe the X-Y addressing of LCD displays.

5.3 Describe types of LCD video drive signals.

5.4 Describe LCD display illumination principles.

Learning outcome 6

Assessment criteria

Describe alternate types of video displays.

6.1 Describe the basic principles of operation of plasma displays.

6.2 Describe the basic principles of other display devices eg. light emitting plastics and gas discharges etc.

Learning outcome 7

Assessment criteria

Describe special display types.

7.1 List special purpose aspect ratios and describe their application.

7.2 State methods of defining the aspect ratio.

7.3 Describe the operating characteristics of HDTV picture tubes, and state their limitations.

7.4 List current HDTV specifications and compare to conventional TV systems.

7.5 Describe the operating characteristics of video walls.

Learning outcome 8

Assessment criteria

Describe the principles of operation of projection displays.

8.1 Sketch the layout and describe the principles of operation of front and rear projection systems.

8.2 Describe typical adjustments for front and rear projection systems.

8.3 Sketch the layout and describe the principles of operation of a single light source projection system.

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 experiments on an individual basis. This will require a range of display devices and test equipment.

Useful references include:

Ibrahim KF 1994, *Television Receivers*
Longman Essex, England
ISBN 0-582-086175

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

Trundle E 1996, *Newnes Guide to TV and Video Technology*
Butterworth-Weinermann Oxford
ISBN 07506 23748

Botto D 1992, *A Basic Guide to Colour TV and VCRs*
Electronics Australia, Federal Publishing, Alexandria

Humphris R, *TV Picture Tubes*
Technician Electronics, KMIT

Occupational health and safety requirements

A safe and healthy environment will be provided for students and teachers as well as safe procedures with regard to learning / teaching activities.