

<b>1 Module Details</b>	
<b>Module Name</b>	Facsimile Machines
<b>Nominal duration</b>	It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 to 40 hours.
<b>Module code</b>	NUE118
<b>Discipline code</b>	0703230
<b>2 Module purpose</b>	This module will provide students with the knowledge and skills to install and perform routine service and maintenance on facsimile machines.
<b>3 Prerequisites</b>	NE110 Data Communications Fundamentals
<b>4 Relationship to competency standards</b>	This module provides some of the knowledge and skills underpinning competency in the following standards: National Electrotechnology Industry Standards, Units NES009 NES106, NES206, NES301, NES402, NES501, and the relevant specialisation. Metals & Engineering Industry Standards, Units 5.1A, 18.57A
<b>5 Content</b>	<ol style="list-style-type: none"> <li>1. Fundamental concepts <ul style="list-style-type: none"> <li>• CCITT standards</li> <li>• analog and digital transmissions</li> <li>• transmission process</li> <li>• phases of facsimile calls</li> </ul> </li> <li>2. Scanning operations <ul style="list-style-type: none"> <li>• single photosensor</li> <li>• CCD Operations</li> <li>• area image sensors</li> <li>• lighting systems</li> <li>• optical systems</li> </ul> </li> <li>3. Signal processing <ul style="list-style-type: none"> <li>• picture reduction</li> <li>• modems</li> </ul> </li> <li>4. Printing processes <ul style="list-style-type: none"> <li>• thermal</li> <li>• plain paper</li> <li>• carbon transfer</li> <li>• ink jet</li> </ul> </li> <li>5. Dialling parameters <ul style="list-style-type: none"> <li>• pulse (decadic) dialling</li> <li>• DTMF</li> <li>• manual dial</li> <li>• blind dial, line and dial detect</li> <li>• redial and listen to dial</li> </ul> </li> <li>6. Coding Systems <ul style="list-style-type: none"> <li>• data compression</li> </ul> </li> </ol>

	<ul style="list-style-type: none"> <li>• Modified Hauffman (MH) systems</li> <li>• Modified Read (MR) systems</li> <li>• Modified Modified Read (MMR) systems</li> <li>• “K” factor</li> <li>• Error Correction Modes (ECM)</li> </ul> <p>7. Operational Principles</p> <ul style="list-style-type: none"> <li>• transmission</li> <li>• reception</li> <li>• copying</li> </ul> <p>8. Installation, operation, maintenance and servicing procedures</p> <ul style="list-style-type: none"> <li>• disassembly and assembly</li> <li>• consumable replacement</li> <li>• cleaning</li> <li>• fault identification</li> <li>• machine faults</li> <li>• line faults</li> </ul> <p>9. Facsimile services</p> <ul style="list-style-type: none"> <li>• faxstream</li> <li>• duet</li> </ul>
<p><b>6 Assessment strategy</b></p> <p><b>Assessment methods</b></p> <p><b>Conditions of assessment</b></p>	<p>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.</p> <p>Normally learning and assessment will take place in a classroom/laboratory environment.</p>
<p><b>7 Learning Outcome Details</b></p> <p><b>Learning Outcome 1</b></p> <p><b>Assessment criteria</b></p> <p><b>Learning Outcome 2</b></p> <p><b>Assessment criteria</b></p>	<p>Describe the fundamental concepts of facsimile machines.</p> <p>1.1 Draw a block diagram and describe the operation of a typical facsimile machine.</p> <p>1.2 State the reason why CCITT standards are necessary.</p> <p>1.3 List the transmission times for G1, G2, G3, super G3 and G4.</p> <p>1.4 Describe the ten steps of the facsimile protocol.</p> <p>Describe the different scanning operations used by facsimile machines.</p> <p>2.1 Briefly describe the scanning differences between analogue and digital facsimiles.</p> <p>2.2 Describe the operational principle of a CCD solid/flat bed read operation.</p> <p>2.3 Describe the operational principle of an “ Area Image Sensor”.</p>

	2.4	Describe the lighting systems required by the various scanning systems.
	2.5	Describe the optical systems required for image scanning.
<b>Learning Outcome 3</b>		Describe the signal processing techniques used in facsimile machines.
<b>Assessment criteria</b>	3.1	Describe the principle of picture reduction.
	3.2	Describe the operational principles of the modem.
	3.3	List the specifications and standards of G1-4 and super G3 type modems.
<b>Learning Outcome 4</b>		Describe the different types of printing process used in facsimile machines.
<b>Assessment criteria</b>	4.1	Describe the thermal printing process.
	4.2	Describe the plain paper printing process.
	4.3	Describe the carbon transfer printing process.
	4.4	Describe the ink jet printing process.
<b>Learning Outcome 5</b>		Describe facsimile machine dialling parameters.
<b>Assessment criteria</b>	5.1	Describe the differences between pulse and tone dialling.
	5.2	Describe Dual Tone Multi Frequency Dialling (DTMF).
	5.3	Describe manual dial set up.
	5.4	Describe blind dial, line and dial tone detect.
	5.5	Describe Redial and Listen to Dial functions.
	5.6	Describe available provider services such as Faxstream and Duet.
<b>Learning Outcome 6</b>		Briefly describe the coding systems used in facsimile transmissions.
<b>Assessment criteria</b>	6.1	Describe the principle of data compression.
	6.2	Describe one dimensional Modified Huffman (MH) coding.
	6.3	Describe two dimensional Modified Read (MR) coding.
	6.4	Describe two dimensional Modified Modified Read (MMR) coding.
	6.5	Describe the "K" factor.
	6.6	Describe the Error Correction Mode (ECM).
<b>Learning Outcome 7</b>		Describe the overall operational principles and the sequence of operations during transmission, reception and copying for thermal and digital facsimile systems.

<b>Assessment criteria</b>	<p>7.1 Draw a basic transmission operation block diagram.</p> <p>7.2 Describe the principles of the transmission operation process.</p> <p>7.3 Draw a basic reception operation block diagram.</p> <p>7.4 Describe the principles of the reception operation process.</p> <p>7.5 Describe connectivity techniques and associated equipment used in facsimile systems.</p> <p>7.6 Describe the principles of broadcast, group and delayed facsimile transmission.</p>
<b>Learning Outcome 8</b>	Demonstrate the installation, maintenance and servicing procedures of a facsimile machine.
<b>Assessment criteria</b>	<p>8.1 Demonstrate the installation of a typical facsimile machine.</p> <p>8.2 Demonstrate a typical disassembly and assembly of a facsimile machine.</p> <p>8.3 Demonstrate the replacement of consumable items.</p> <p>8.4 Demonstrate a typical cleaning operation of a facsimile machine.</p> <p>8.5 Identify typical faults in facsimile machines.</p> <p>8.6 Demonstrate the use of standard test facilities using facilities such as FOLDS A and FOLDS B.</p>
<b>8 Delivery of the module</b>	
<b>Delivery strategy</b>	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.
<b>Resource requirements</b>	<p>Resources should be sufficient for students to carry out practical exercises on an individual basis. This will require a range of facsimile machines and consumables</p> <p>Useful references include a range of manufacturers operational and maintenance manuals for facsimile machines.</p>
<b>Occupational health and safety requirements</b>	A safe and healthy environment will be provided for students and teachers as well as safety procedures followed with regard to teaching/learning activities.