

<p>1 <b>Module Details</b></p>	
<p><b>Module Name</b></p>	<p>Printed Circuit Board Assembly Correction</p>
<p><b>Nominal duration</b></p>	<p>It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 18 – 20 hours</p>
<p><b>Module code</b></p>	<p>NUE131</p>
<p><b>Discipline code</b></p>	<p>0703230</p>
<p>2 <b>Module purpose</b></p>	<p>This module will provide students with the generic knowledge and skills underpinning printed circuit board assembly line fault identification and correction.</p>
<p>3 <b>Prerequisites</b></p>	<p>NUE130 Automated Surface Mount Assembly</p>
<p>4 <b>Relationship to competency standards</b></p>	<p>This module provides some of the knowledge and skills underpinning competency in the following standards: National Electrotechnology Industry Standards, Units NES201, NES202, NES401, NES111</p>
<p>5 <b>Content</b></p>	<ol style="list-style-type: none"> <li>1. Manual Screen Printing <ul style="list-style-type: none"> <li>• Equipment</li> <li>• Process</li> <li>• Faults <ul style="list-style-type: none"> <li>Identification</li> <li>Correction</li> </ul> </li> </ul> </li>   <li>2. Automated Screen Printing <ul style="list-style-type: none"> <li>• Equipment</li> <li>• Process</li> <li>• Faults <ul style="list-style-type: none"> <li>Identification</li> <li>Correction</li> </ul> </li> </ul> </li>   <li>3. Automated Insertion of Surface Mount Components <ul style="list-style-type: none"> <li>• Equipment</li> <li>• Process</li> <li>• Faults <ul style="list-style-type: none"> <li>Machine accuracy</li> <li>Tolerance</li> <li>Component orientation</li> <li>Component damage</li> </ul> </li> </ul> </li>   <li>4. Reflow Soldering <ul style="list-style-type: none"> <li>• Equipment</li> <li>• Process</li> <li>• Faults <ul style="list-style-type: none"> <li>Solder paste quality</li> <li>Temperature profile</li> <li>Cleanliness</li> <li>Paste smearing</li> <li>Component alignment</li> </ul> </li> </ul> </li>   <li>5. Wave Soldering</li> </ol>

- Equipment
- Process
- Faults
  - Temperature profile
  - Cleanliness
  - Component alignment

## 6 Assessment strategy

### Assessment methods

Assessment should be progressive reflecting a holistic approach to ensure the module purpose is met. In general, 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. The assessment should focus on the practical skills emphasised in the module.

### Conditions of assessment

Learning and assessment may take place in either a classroom/laboratory or an industrial workshop environment

## 7 Learning Outcome Details

### Learning Outcome 1

Carry out corrective action on manual screen printing equipment

### Assessment criteria

- 1.1 Briefly describe the operations involved in a typical manual screen printing process.
- 1.2 List common faults that occur in a typical manual screen printing process.
- 1.3 Identify manual screen printing faults following a test production run.
- 1.4 Perform adjustments that rectify common faults occurring in manual screen printing processes and equipment.

### Learning Outcome 2

Carry out corrective action on automated screen printing equipment.

### Assessment criteria

- 2.1 Briefly describe the operations involved in a typical automated screen printing process.
- 2.2 List common faults that occur in a typical automated screen printing process.
- 2.3 Identify automated screen printing faults following a test production run.
- 2.4 Perform adjustments that rectify common faults occurring in automated screen printing processes and equipment.

<b>Learning Outcome 3</b>	Carry out corrective action on automated pick and place equipment for surface mount components.
<b>Assessment criteria</b>	<p>3.1 Briefly describe the operations involved in a typical automated pick and place process.</p> <p>3.2 List common faults that occur in a typical automated pick and place process.</p> <p>3.3 Identify automated pick and place faults following a test production run.</p> <p>3.4 Perform adjustments that rectify common faults occurring in automated pick and place processes and equipment.</p>
<b>Learning Outcome 4</b>	Carry out corrective action on reflow soldering equipment
<b>Assessment criteria</b>	<p>4.1 Briefly describe the operations performed in a typical reflow soldering process.</p> <p>4.2 List common faults that occur in a typical reflow soldering process.</p> <p>4.3 Identify reflow soldering faults following a test production run.</p> <p>4.4 Perform adjustments that rectify common faults occurring in reflow soldering processes and equipment.</p>
<b>Learning Outcome 5</b>	Carry out corrective action on wave soldering equipment
<b>Assessment criteria</b>	<p>5.1 Briefly describe the operations involved in a typical wave soldering process.</p> <p>5.2 List common faults that occur in a typical wave soldering process.</p> <p>5.3 Identify typical wave soldering faults following a test production run.</p> <p>5.4 Perform adjustments that rectify common faults occurring in wave soldering equipment and production processes.</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

	<p>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.</p> <p>This module is designed to be taught on industrial premises. It is important that occupational health and safety issues, static discharge avoidance and workplace cleanliness are reinforced throughout the delivery of this module.</p>
<b>Resource requirements</b>	<p>Resources should be sufficient for students to carry out practical exercises on an individual basis. This will require:</p> <ul style="list-style-type: none"><li>Manual screening printing equipment</li><li>Automatic screening printing equipment</li><li>Automatic pick and place machines</li><li>Reflow soldering equipment</li><li>Wave soldering equipment</li></ul> <p>Useful references include:</p> <p>US National Standards: ANSI/J-STD-001: Requirements for Soldered Electrical and Electronic Assemblies.</p> <p>IPC-A-610: Acceptability of Electronic Assemblies.</p> <p>IPC 7711: Rework of Electronic Assemblies.</p> <p>NEEITC, Electronic Soldering Techniques, Ambassador Press 1991.</p> <p>IEC 61340-5-1: ELECTROSTATIC – Part 5 Specification for The protection of electronic devices from electrostatic phenomena Section 1: General Requirements.</p> <p>IEC 61340-5-2: ELECTROSTATIC – Part 5 Specification for the protection of electronic devices from electrostatic phenomena – Section 2: User Guide.</p> <p>IPC-HDBK-001. Handbook and Guide to requirements for Soldered Electrical and Electronic Assemblies.</p>
<b>Occupational health and safety requirements</b>	<p>A safe and healthy environment will be provided for students and teachers as well as safety procedures followed with regard to teaching/learning activities.</p>