

1 Module Details	
Module Name	Colour Photocopying Principles
Nominal duration	It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 36 to 40 hours.
Module code	NUE117
Discipline code	0703230
2 Module purpose	This module provides the student with an overview of digital colour photocopying principles together with the basic skills to carry out routine maintenance and servicing of colour photocopiers.
3 Prerequisites	Photocopier Operating Principles
4 Relationship to competency standards	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
5 Content	<ol style="list-style-type: none">1. Principles of colour and colour separation<ul style="list-style-type: none">• Effects of light on the eye• Colour principles• Colour separation• Colour mixing processes• Colour Wheel2. Colour separation in colour photocopying<ul style="list-style-type: none">• Three scan process• Four scan process• Under colour removal3. Principles of colour photocopying<ul style="list-style-type: none">• Reflected light paths• Block diagrams of photocopiers• Principles of operation4. Scanning processes of colour photocopiers<ul style="list-style-type: none">• CCD• Pre amps• Auto gain• Image Processing Unit• Laser unit• Exposure processes5. Printing processes of colour photocopiers<ul style="list-style-type: none">• Laser diode unit• Polygon mirrors• Laser synchronising and detector• Cylindrical lens6. Routine maintenance and servicing

	<ul style="list-style-type: none"> • Optics • Paper feeds • Developer unit • Drum unit • Belts and rollers • Fusing unit
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 classroom/laboratory environment.
7 Learning Outcome Details	
Learning Outcome 1	Describe the basic principles of colour and colour separation.
Assessment criteria	<p>1.1 Describe the effect of light on the rods and cones of the eye.</p> <p>1.2 Describe the concept of intrinsic colour and luminous objects.</p> <p>1.3 Describe the subtractive colour mixing process.</p> <p>1.4 Describe the additive colour mixing process</p> <p>1.5 Describe the colour separation process using additive and subtract and subtractive filters.</p> <p>1.6 Draw a simple "Colour Wheel" showing the relationship between additive and subtractive primaries.</p>
Learning Outcome 2	Describe the colour separation process used in colour photocopying.
Assessment criteria	<p>2.1 Describe the colour separation process used in three scan colour photocopiers.</p> <p>2.2 Describe the colour separation process used in four scan colour photocopiers.</p> <p>2.3 Describe the process of "under colour removal".</p>
Learning Outcome 3	Describe the basic principles of the colour photocopying process.
Assessment criteria	<p>3.1 Describe the path that reflected light takes to the photoconductor in an analog copier.</p> <p>3.2 Draw a simple block diagram of a digital black and white photocopier.</p> <p>3.3 Describe the principle of operation of a digital black and white photocopier.</p> <p>3.4 Draw a simple block diagram of a four scan colour photocopier.</p>

	3.5	Describe the principle of operation of a four scan colour photocopier.
Learning Outcome 4		Describe the scanning processes of digital colour photocopiers.
Assessment criteria	4.1	Describe the legal requirements governing colour photocopier usage.
	4.2	Describe the principle of operation of a colour processing CCD.
	4.3	Describe the principle of operation of the A/D conversion circuit.
	4.4	Describe the principle of operation of the Image Processing Unit (IPU) including: Modulation transfer correction, dithering, smoothing, gamma correction, binary processing, auto shading and image editing.
	4.5	Draw a simple block diagram of an IPU.
	4.6	Describe the principle of the exposure process in four scan and single scan high speed colour photocopier.
Learning Outcome 5		Describe the printing process of a colour photocopier.
Assessment criteria	5.1	Describe the xerographic process of writing the colour image to the drum/belt.
	5.2	State the need for, and operation of, four separate developer units and colour toner hoppers.
	5.3	Describe the process for transferring the image from the drum/belt to the paper.
	5.4	Describe the benefits of using Si oil in the fusing unit.
Learning Outcome 6		Demonstrate skills necessary to perform routine maintenance and service on a colour photocopier.
Assessment criteria	6.1	Demonstrate routine maintenance and service to the optics unit.
	6.2	Demonstrate routine maintenance and service to the main body paper feed.
	6.3	Demonstrate routine maintenance and service to the paper supply unit.
	6.4	Demonstrate routine maintenance and service to the developer unit.
	6.5	Demonstrate routine maintenance and service to the drum unit.
	6.6	Demonstrate routine maintenance and service to the cleaner unit.
	6.7	Demonstrate routine maintenance and service to the transfer belts, transport belts and rollers.
	6.8	Demonstrate routine maintenance and service to the fusing unit.
8 Delivery of the module		
Delivery strategy		Delivery strategies must be suitable for learning both theoretical and practical aspects described in the module

	<p>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.</p>
Resource requirements	<p>Resources should be sufficient for students to carry out practical exercises on an individual basis. This will require a range of photocopiers and consumables</p>
	<p>Useful references include a range of manufacturers operational and maintenance manuals for business machines.</p>
Occupational health and safety requirements	<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>