

1 Module Details	
Module Name	Business Machine Transducers
Nominal duration	It is expected that students with the appropriate entry knowledge and skills will successfully complete this module in 18 to 20 hours.
Module code	NUE114
Discipline code	0703230
2 Module purpose	To provide student with the knowledge and skills to describe the basic operating principles of typical transducers and sensing principles.
3 Prerequisites	NUE052 Applied Electricity 1
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. Introduction to transducers<ul style="list-style-type: none">Definition and basicsLinear position & velocityAngular position measurementAngular velocity measurementTemperature sensorsHumidity sensorsCurrent sensorsPiezo sensors2. Temperature sensors<ul style="list-style-type: none">IntroductionThermocouplesResistance temperature detectors (RTD)ThermistorsBimetal temperature sensorsApplications3. Optoelectronics devices<ul style="list-style-type: none">IntroductionPhotoresistorsPhotodiodesPhototransistorsLASCRPhotovoltaic devicesOptocouplersLaserApplications

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

State the definition of a transducer and name the two blocks comprising any transducer

Assessment criteria

- 1.1 Describe the basic principle of linear motion measurement
- 1.2 Draw a basic mechanical arrangement to sense angular motion
- 1.3 State the two basic methods of measuring rotary speed
- 1.4 State the two basic methods of operation of a temperature measuring transducer

Learning Outcome 2

Describe the basic operating principles and applications of thermistors, thermocouples, resistance temperature detectors (RTD) and bimetal temperature sensors.

Assessment criteria

- 2.1 Describe the basic operating principle of a thermocouple.
- 2.2 State the disadvantages of RTD sensors as compared to thermocouples.
- 2.3 Describe the basic operating principle of a thermistor.
- 2.4 State the advantages of thermistors when used as temperature transducers.
- 2.5 Describe the basic operating principle of bimetal temperature sensors.
- 2.6 State the relative advantages of bimetal temperature sensors.
- 2.7 List common applications.

Learning Outcome 3

Describe the basic operating principle and applications of typical photoelectronic transducers found in machines.

Assessment criteria

- 3.1 Define the term "optoelectronic device".
- 3.2 Describe the basic operating principles of photoresistors (bulk type photoconductive sensor).
- 3.3 Describe the basic operating principle of a photodiode and a phototransistor.
- 3.4 State a typical application for the light activated SCR (LASCR).
- 3.5 Define the term "photovoltaic effect".

	<p>3.6 Draw the basic circuit of an optocoupler.</p> <p>3.7 State a typical application for optocouplers.</p> <p>3.8 Describe the difference in the light emitted from an incandescent lamp and that from a LASER.</p>
8 Delivery of the module	
Delivery strategy	<p>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.</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 business machines and associated transducers.</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>