

1 Module Details	
Module Name	Advanced Anaesthesia, Monitoring & Gases
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	NUE920
Discipline code	0703230
2 Module purpose	This module provides students with knowledge of clinical anaesthesia and the application, hazards and common faults of anaesthetic monitoring equipment. In addition, the module provides students with the skills to perform functional verification of the equipment to AS3551.
3 Prerequisites	Common Medical Equipment 1 (NUE915)
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 NES304, NES406, NES504 and the relevant specialisation. Metals & Engineering Industry Standards, Units 18.56A, 18.57A, 18.58A, 18.65A, 18.66A.
5 Content	<ol style="list-style-type: none">1. Hardware associated with delivery of gases for anaesthesia<ul style="list-style-type: none">• gas supply system• hazards• security requirements• common sources of failure2. Gases and volatile agents used in modern anaesthesia<ul style="list-style-type: none">• types• clinical function3. Introduction to anaesthetic monitoring equipment<ul style="list-style-type: none">• function• application4. Monitoring requirements in a typical anaesthetic procedure<ul style="list-style-type: none">• anaesthetic unit• anaesthetic gas• patient5. Common hazards<ul style="list-style-type: none">• operator errors• equipment malfunction• inappropriate gas mixture and delivery• patient response6. Functional testing to AS3551

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.
7 Learning Outcome Details	
Learning Outcome 1	Describe the normally installed hardware associated with delivery of gases for anaesthesia.
Assessment criteria	<p>1.1 Describe the gas supply system from bulk storage to operating theatre which is normally installed in hospitals.</p> <p>1.2 Describe the back-up provisions which normally support such an installation, both at the supply end, and in the clinical areas.</p> <p>1.3 Describe the hazards associated with such equipment, appropriate security requirements and the common sources of failure of medical gas delivery to operating theatres.</p> <p>1.4 Describe the functional validation of such equipment which might be expected of a contractor supporting the medical gas supply for a health care establishment.</p>
Learning Outcome 2	List gases and volatile agents used in modern anaesthesia and the clinical function of each.
Assessment criteria	<p>2.1 List gases and volatile agents used in modern anaesthesia.</p> <p>2.2 Explain the clinical function of the above gases and volatile agents.</p>
Learning Outcome 3	Describe the function and application of anaesthetic monitoring equipment.
Assessment criteria	<p>3.1 Outline clinical situations which necessitate the use of anaesthetic monitoring equipment</p> <p>3.2 Describe the principles of operation of the various types of anaesthetic monitoring equipment.</p>
Learning Outcome 4	Describe the monitoring requirements for the anaesthetic unit, the anaesthetic gases and patient in a typical general anaesthetic procedure.
Assessment criteria	4.1 Describe the monitoring requirements for the anaesthetic unit in a typical anaesthetic procedure including pressure limits, gas purity over pressure

	<p>relief, disconnection and alarms.</p> <p>4.2 Describe the monitoring requirements for the anaesthetic gases in a typical general anaesthetic procedure with regard to hypoxia, agent concentration, carbon dioxide removal</p> <p>4.3 Describe the monitoring requirements for the patient in a typical general anaesthetic procedure with regard to ECG – pulse rate – respiration, oxygen saturation, blood pressure, card output, temperature.</p>
Learning Outcome 5	Describe common hazards of anaesthesia in terms of operator error, equipment malfunction, inappropriate gas mixture and delivery, patient response.
Assessment criteria	<p>5.1 Describe the common hazards of anaesthesia caused by operator errors with regard to circuit integrity, patient disconnection, gas mixture and flow rates.</p> <p>5.2 Describe the common hazards of anaesthesia caused by equipment malfunction including electro-mechanical equipment, circuit leaks, vapour calibration, gas monitor drift, gas or power failure.</p> <p>5.3 Describe the common hazards of anaesthesia caused by inappropriate gas mixture and delivery.</p> <p>5.4 Describe the common hazards of anaesthesia caused by patient response with regard to ECG – pulse rate – respiration, oxygen saturation, blood pressure, card output, temperature</p>
Learning Outcome 6	Perform the functional testing of anaesthetic monitoring equipment to AS3551.
Assessment criteria	<p>6.1 List the essential safety and performance parameters which should be tested and documented.</p> <p>6.2 List the test equipment necessary to test the required parameters.</p> <p>6.3 Perform and document the functional verification of anaesthetic monitoring equipment to AS3551</p>
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	<p>Access to the relevant medical equipment for demonstration purposes.</p> <p>Useful references include: Carr, Joseph J., Brown John M. <i>Introduction to Biomedical Equipment Technology</i>, Third Edition, Prentice Hall, 1998. ISBN 0-13-849431-2</p>

Occupational health and safety requirements

Carr, Joseph J. *Biomedical Equipment - Use, Maintenance and Management*, Prentice Hall, 1992.
ISBN 0-13-257577-9

Petty, C *The Anesthesia Machine*, Churchill Livingstone NY 1987.
ISBN 0-443-08405-X

Dorsch, JA & Dorsch SE *Understanding Anesthesia Equipment*, Williams & Williams Baltimore 1984
ISBN 0-683-02615-1

A range of manufacturers operational and maintenance manuals for the relevant medical equipment.

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