NATIONAL CERTIFICATE MODULE DESCRIPTOR

-Module Number-	**0081056**	**-Session-1988-89**
-Superclass-	**RB**	
-Title-	**MATHEMATICS: LABORATORY NUMERACY M1/LN2**	

-DESCRIPTION-

Purpose

This module is designed for the student who is interested in, or employed at an introductory level by, health, caring, water, cleaning, food or other science-based industries. It enables the student to acquire the mathematical confidence to apply numerical skills to problems relevant to those industries.

Refer to the Appendix for guidance on the framework of the mathematics modules.

Preferred
Entry Level

Standard Grade in Mathematics at 5, or equivalent.

Learning
Outcomes

The student should:

1.   carry out basic laboratory calculations;

2.   use formulae relevant to scientific applications;

3.   read charts, graphs, tables and scales;

4.   prepare graphs from data;

5.   complete a project which requires the application of mathematical knowledge and skills.

Content/
Context

Corresponding to Learning Outcomes 1-5:

1.   Using decimal fractions and simple vulgar fractions; using a calculator; rounding numbers to a given number of significant figures/decimal places; writing numbers in conventional form and in scientific notation; calculating absolute and relative error bounds; calculating tolerance; calculating ratios and using ratios and proportion; calculating and using percentages.

2.   Substituting directly into formulae using appropriate units and their standard abbreviations.

3.   Reading statistical charts (pie, bar, line graphs) and using results; reading nomograms and using results; reading appropriate gauges and scales and using the readings; reading and applying data tables.

4.   Preparing graphs from data.

5.   The project should involve the application of the content of the other Learning Outcomes.

Suggested Learning and Teaching Approaches

A practical approach should be used throughout this module to develop the basic concepts. Whenever possible graphical methods should support numerical methods and, with the co-operation of the laboratory tutor, should be followed by an application.

The sensible use of the calculator should be encouraged. Students must always be prepared to question calculator answers and be able to give mental approximations.

Consolidation of numerical skills should not consist entirely of mechanical exercises but should include problem solving related to the work the students are likely to undertake in business or industry.

A typical project should take 8-12 hours to complete and should involve as many as possible of the topics noted in the content.

Students should maintain a workfile. This should form a complete record of the student's work throughout the module. The tutor should ascertain periodically throughout the module that each student is maintaining the workfile adequately. The workfile should contain (as appropriate) the student's notes, class handouts, completed worksheets, exercises, assignments, report(s) of investigation(s), report(s) of project(s), log book of computer activities and a summary of the important details of the module for later revision purposes.

Assessment Procedures

Acceptable performance in the module will be satisfactory achievement of all the performance criteria specified for each Learning Outcome.

The following abbreviations are used below:

LO   Learning Outcome
IA   Instrument of Assessment
PC   Performance Criteria

LO1 CARRY OUT BASIC WORKSHOP CALCULATIONS

PC   The student:

(a)   rounds a number to a given number of significant figures/decimal places;
(b)   converts a number from standard notation to scientific notation and vice versa;
(c)   calculates tolerances in operations involving 2 numbers;
(d)   uses ratios and proportion (direct and inverse);
(e)   uses percentages in the form of a % of a quantity and a quantity as a % of another quantity.

IA   Calculation Exercise

Topics should be assessed on the number of occasions indicated:

(a)   rounding numbers   6
(b)   notation   3
(c)   tolerances   3
(d)   ratios and proportion   4
(e)   percentages   3

One question may cover more than one topic.

Satisfactory achievement of the Learning Outcome will be demonstrated by the student producing at least 4 correct responses for (a), at least 2 correct responses for each of (b), (c) and (e) and at least 3 correct responses for (d).

LO2 USE FORMULAE RELEVANT TO LABORATORY APPLICATIONS

The student:

(a)   correctly substitutes into a formula relevant to his/her branch of laboratory science;
(b)   uses correctly units and standard abbreviations.

IA   Calculation Exercise

Satisfactory achievement of the Learning Outcome will be demonstrated by the student correctly substituting into a formula on one occasion.

LO3 READ CHARTS, GRAPHS, TABLES AND SCALES

PC   The student:

(a)   extracts information form charts;
(b)   extracts information from a graph;
(c)   extracts information from a table;
(d)   extracts information from scales.

IA   Assignment

Topics should be assessed on the number of occasions indicated:

(a)   charts   2
(b)   graphs   1
(c)   tables   1
(d)   scales   1

One question may involve more than one topic.

Satisfactory achievement of the Learning Outcome will be demonstrated by the student producing the correct response for each of (a), (b), (c) and (d).

LO4 PREPARE GRAPHS FROM DATA

PC   The student produces, from given data, a graph with:

(a) correctly labelled axes; (b) appropriate scales; (c) no more than one point misplotted; (d) a reasonably fitting straight-line or curve drawn where appropriate.

IA   Graphical Exercise

Satisfactory achievement of the Learning Outcome will be demonstrated by the student producing one graph.

LO5 COMPLETE A PROJECT WHICH REQUIRES THE APPLICATION OF MATHEMATICAL KNOWLEDGE AND SKILLS

PC   The student:

(a) plans a project; (b) gathers appropriate information; (c) analyses the information; (d) summarises the results.

IA   Project

The project should involve as many topics as possible from the other Learning Outcomes and should take 8-12 hours to complete. The student, where appropriate, could co-operate with other students when carrying out the tasks relating to the project. The final project report however should be the student's own work.

Satisfactory achievement of the Learning Outcome will be demonstrated by the student producing a project report which shows evidence of the completion of each process in the performance criteria.

02/12/98