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Mathematics in Education and Industry

# **MEI STRUCTURED MATHEMATICS**

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## **Numerical Methods Coursework**

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## Numerical Methods coursework

The coursework for this module, as with all other modules, is marked out of 18 and is worth 20% of the total for the module. The mark is added to the mark for the examination – marks for coursework often enhance the written examination mark.

The objectives are:

- *To develop skills in the areas of problem identification, use of numerical methods and control of error in practice.*
- *To enable students to demonstrate a facility with technology and an awareness of the difficulties that can arise when computers are used to do mathematics.*

Students are expected to investigate a problem which uses one of the methods of numerical solution from the syllabus for the module. In this module they may stray into Numerical Computation which does not have any coursework.

It is expected that the problem will not have an analytical solution.

It is essential that students demonstrate their ability to use and familiarity with spreadsheets.

An understanding of the accuracy of the solution is also essential. This may be done via theoretical analysis of errors, or by adequate justification of the accuracy via successive iterates.

There are six domains.

**Problem Specification**

The problem is identified and there is an explanation of why a numerical solution is appropriate

**Strategy**

The procedure for obtaining the solution is appropriate and is explained.

**Application**

The procedure is applied successfully

**Use of technology**

The appropriate software is used and explained

**Error analysis**

The accuracy of the solution is discussed either in terms of the theory of errors or by appropriate discussion of successive iterates.

**Interpretation**

The solution is expressed, with a discussion of the validity and limitations.

**Areas suitable for coursework**

**Solution of equations**

*Care must be taken not to merely repeat the coursework assignment for Core, C3. No credit will be given for this. The task must be of a more substantial nature.*

**Errors**

**Numerical Integration**

*Students should not use numerical methods simply to evaluate a definite integral which they know how to integrate analytically.*

**Finite Differences**