

Numerical Analysis

Module Code:	COS5018-B
Academic Year:	2018-19
Credit Rating:	20
School:	Department of Computer Science
Subject Area:	Computer Science
FHEQ Level:	FHEQ Level 5
Module Leader:	Dr Ci Lei

Additional Tutors:

Pre-requisites:

Co-requisites:

Contact Hours

Type	Hours
Lectures	12
Tutorials	12
Laboratory	12
Directed Study	162
Examinations DO NOT USE	2

Availability Periods

Occurrence	Location/Period
NLA	Namal College / Semester 1 (Sep - Jan)
BDA	University of Bradford / Semester 1 (Sep - Jan)

Module Aims

To introduce the basic concepts of error analysis and iteration, and elementary numerical methods for solving algebraic equations. To develop and implement efficient numerical

algorithms using Matlab/Scilab. To instil an appreciation of the techniques available for numerical interpolation and linear algebra.

Outline Syllabus

- a) Errors; iteration; iterative solution of $f(x) = 0$; systems of equations, finite difference methods; numerical integration; polynomials; interpolation, polynomial least squares approximation; assembly language
- b) Introduction to Computer Theory: Basic concepts of formal language theory; alphabets, strings, languages, operations on string and languages, recursive definitions, regular expressions, finite automata, deterministic and non-deterministic finite automata, Kleene's theorem, pushdown automata context-free grammars, turing machines, computability, decidability.
- c) Introduction to probability and statistics: Averages, standard deviation, probability and conditional probability of events, probability distribution.

Module Learning Outcomes

On successful completion of this module, students will be able to...

- 1 show a breadth of knowledge and appreciation of some of the basic techniques of numerical analysis and explain the fundamental concepts of computer theory.
- 2 apply in realistic situations the fundamental methods of numerical algebra and calculus and construct/validate many of the logical tools inherent in the construction and analysis of computer systems.
- 3 learn and work independently with patience and persistence using good general skills of organization and time-management, be adaptable with a readiness to assess problems from new areas logically through an analytical approach, write coherently and clearly communicate results.

Learning, Teaching and Assessment Strategy

The basic theory and illustrative examples are presented and developed in formal lectures. Complementary tailor-made example sheets are provided. These are discussed, and assistance with their solution is provided in laboratory sessions, either on a one-to-one basis or as a staff or student-led group, as appropriate.

Formative tasks are provided to encourage ongoing digestion of the material, with the extent of the cumulative knowledge and skills acquired assessed through a coursework assignment and a formal examination.

Mode of Assessment

Type	Method	Description	Length	Weighting	Final Assess'
Summative	Examination - closed book	Examination	2 hours	70%	Yes

Referral	Examination - closed book	Supplementary Examination	3 hours	100%	No
Summative	Coursework	Individual Coursework		30%	No

Legacy Code (if applicable)

CM-0235D

Reading List

To view Reading List, please go to [rebus:list](#).