

COURSE DETAIL

NUMERICAL ALGORITHMS

Country

Ireland

Host Institution

University College Dublin

Program(s)

University College Dublin

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Statistics Mathematics

UCEAP Course Number

118

UCEAP Course Suffix**UCEAP Official Title**

NUMERICAL ALGORITHMS

UCEAP Transcript Title

NUMRICAL ALGORITHMS

UCEAP Quarter Units

4.00

UCEAP Semester Units

2.70

Course Description

This course covers MATLAB programming (data types and structures, arithmetic operations, functions, input and output, interface programming, graphics and implementation of numerical methods); finite floating point arithmetic, catastrophic cancellation, and chopping and rounding errors); solution of nonlinear equations (bisection method, secant method, Newton's method, fixed point iteration, and Muller's method); numerical optimization (method of golden section search and Newton's optimization method); solutions of linear algebraic equations (forwarding Gaussian elimination, pivoting, scaling, back substitution, LU-decomposition, norms and errors, condition numbers, iterations, Newton's method for systems, and computer implementation); interpolation (Lagrange interpolation, Newton interpolation, and inverse interpolation); numerical integration (finite differences, Newton cotes rules, trapezoidal rule, Simpson's rule, extrapolation, Gaussian quadrature); and numerical solution of ordinary differential equations (Euler's method, Runge-Kutta method, multi-step methods, predictor-corrector methods, rates of convergence, global errors, algebraic and shooting methods for boundary value problems, and computer implementation).

Language(s) of Instruction

English

Host Institution Course Number

ACM40290

Host Institution Course Title

NUMERICAL ALGORITHMS

Host Institution Course Details

Host Institution Campus

UC Dublin

Host Institution Faculty

Host Institution Degree

Host Institution Department

Applied & Computational Maths

Course Last Reviewed

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