

Module title: Advanced Numerical Analysis I

Module Code: 28-10-605-01

Module Credit: 4

Term: First term 1404-1405

Lecturer: Dr. M. Arab-Ameri (arabameri@math.usb.ac.ir)

Lecturing time, & Lecturing place: Saturday (7:30 – 9:30), class 37, and Sunday (7:30 – 9:30), class 37.

Assessments: 15% mid-term 1 exam: 1404/8/03

35% mid-term 2 exam: 1404/9/08

40% final exam: 1404/10/30

5% home works

5% class attendance

References: Introduction to numerical analysis
(3th Edition, 2002) **J. Stoer and R. Bulirsch**

Module Subjects:

Error Analysis

1th week: Representation of Numbers, Round off Errors and Floating-Point Arithmetic

2th week: Error Propagation

Interpolation

3th week: Interpolation by Polynomials, Theoretical Foundation, The Interpolation Formula of Lagrange

4th week: Neville's Algorithm, Newton's Interpolation Formula: Divided Differences

5th week: The Error in Polynomial Interpolation

6th week: Hermite Interpolation

7th week: Interpolation by Rational Functions

8th week: Trigonometric Interpolation

9th week: Fast Fourier Transforms

10th week: Interpolation by Spline Functions

Topics in Integration

11th week: The Integration Formulas of Newton and Cotes

12th week: Peano's Error Representation

13th week: The Euler-Maclaurin Summation Formula

14th week: Integration by Extrapolation

15th and 16th week: Gaussian Integration Methods