LOGO DELLA STRUTTURA PRIMARIA

COURSE: NUMERICAL ANALYSIS PART B			
ACADEMIC YEAR: 2017/2018			
TYPE OF EDUCATIONAL ACTIVITY: Characterizing			
TEACHER: Concetta Laurita			
e-mail: concetta.laurita@unibas.it		website:	
phone: 0971205846		mobile (optional):	
Language: Italian			
ECTS: 6	n. of total hours: 56 n. of hours of lessons: 32 n. of hours of practice: 24	Campus: Potenza Dept: DiMIE Program: Mathematics	Semester: Second

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

To know the main numerical methods applied in different contexts: approximation of functions, numerical integration.

To be able to choose between antagonists methods for solving a specific problem, comparing the order of covergence, stability of algorithms, computational cost.

To achieve a good level in programming algorithms, for example in MatLab, in order to apply the studied numerical methods.

To be able to read the numerical results provided by the machine when a numerical procedure is implemented.

PRE-REQUIREMENTS

The knowledge of the arguments from Calculus and Linear Algebra, basic of computer science and MatLab programming fundamentals.

SYLLABUS

Approximation of functions

Algebraic polynomial approximation by Lagrange interpolation. Interpolation by piecewise polynomial functions. Spline functions. Least squares approximation.

Numerical integration

Quadrature formulas. Stability, convergence, degree of accuracy, error estimation. Newton-Cotes quadrature rules. The trigonometric quadrature formula. Quadrature formulas of interpolatory type. Gaussian quadrature formulas.

Practical implementation of the studied algorithms in MatLab

TEACHING METHODS

Theoretical lessons, Laboratory tutorials.

EVALUATION METHODS

Practical test and oral examination.

The aim of the examination is to test the level of achievement of the previously mentioned educational goals.

The exam is divided into 2 parts:

- a practical test with the computer (resolution of three numerical exercises) on all the topics covered in the course; the test is intended to assess the understanding of the topics and the ability to choose between the different methods studied in the numerical solution of a specific problem. The student who does not show sufficient knowledge of the subjects is not admitted to the oral test; to pass the test one must acquire at least 18 points out of 30. The estimated time for the test is 2.5 hour
- an oral test which will evaluate the ability to link and compare different aspects covered during the course; to pass the test one must acquire at least 18 points out of 30.

Students who take the course may subdivide written test in two separate tests to be performed at each end of the lessons in each module. In that case, the written test is passed if the student acquires at least 18 points out of 30 in both tests.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Lecture notes and teaching material for exercises provided by the teacher, available on the online learning platform

of the website of the degree courses in Mathematics.

TEXTBOOKS

- G. Monegato, Fondamenti di Calcolo Numerico, CLUT (Torino)
- A. Quarteroni, R. Sacco, F. Saleri, Matematica Numerica, Springer

INTERACTION WITH STUDENTS

At the beginning of the course, after describing the objectives, program and evaluation methods, the teacher collects the list of students who intend to enroll in the course, together with name, serial number and email. The teacher at the beginning of the discussion on each item makes available the lecture notes on the online learning platform of the website of the degree courses in mathematics.

Office hours: Monday and Wednesday from 15.30 to 17.30.

In addition to weekly reception, the teacher is available at all times for a contact with the students through their e-mail.

EXAMINATION SESSIONS (FORECAST)[1]

18/06/2018, 4/07/2018, 18/07/2018, 20/09/2018, 24/10/2017, 20/12/2018

SEMINARS BY EXTERNAL EXPERTS YES □ NO x

FURTHER INFORMATION

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.