2309 MATH400/MATH200 Course Outline

Subject Code	:	MATH400/MATH200
Subject Title	:	NUMERICAL COMPUTATION
Course Type	:	Elective
Level	:	3
Credits	:	3
Teaching Activity	:	Lecture 39 hours
	:	Experiment 6 hours
Prior Knowledge*	:	MATH102 Calculus II, MATH100 Linear algebra

Class Schedule :

Class	Week	Time	Classroom	Date
D1	TUE	9:00-11:50	C408	2023/09/04-2023/12/17
D2	THU	9:00-11:50	C404	2023/09/04-2023/12/17
D3	WED	9:00-11:50	C408	2023/09/04-2023/12/17

Instructor	:	Zhanchuan Cai
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E-mail Address	:	zccai@must.edu.mo
Office	:	A323
Office Hour	:	Monday (15:00-17:30) Tuesday (15:00-17:30) Wednesday (15:00-18:00) Thursday (15:00-17:00)

COURSE DESCRIPTION

This subject aims to numerically solve all kinds of mathematical problems which arise from practical applications and can be modelled by different mathematical equations or inequalities, for example, linear or nonlinear differential equations and integral equations. Students should understand and master the basic theory of numerical analysis and the methods to solve mathematical problems numerically. To realize related algorithms by MATLAB are also required

TEXT BOOK

Required Text Book:

Book title：Numerical Analysis with Matlab

Author/Editor：John H. Mathews/Kurtis D. Fink

Edition：4

ISBN：ISBN-13: 978-0130652485

Date：1999

Reference Book:

Book title：Numerical Analysis with Matlab
Author/Editor：John H. Mathews/Kurtis D. Fink
Edition：4
ISBN：9787121094125
Date：2009

INTENDED LEARNING OUTCOMES

Upon successful completion of this subject, students will be able to:

1. Be aware of the use of numerical methods in modern scientific computing
2. Be familiar with finite precision computation,
3. Be familiar with numerical solutions of nonlinear equations in a single variable,
4. Be familiar with numerical interpolation and approximation of functions,
5. Be familiar with numerical integration and differentiation
6. Be familiar with numerical solution of ordinary differential equations
7. Be familiar with calculation and interpretation of errors in numerical methods,
8. Be familiar with programming with numerical packages like MATLAB

Weekly Schedule

Week	Topic	Hours	Teaching Method
1	Matlab Language	3	lecture / lab
2	Solutions of Nonlinear Equations	3	lecture / lab
3	Solutions of Nonlinear Equations	3	lecture / lab
4	Solutions of Nonlinear Equations	3	lecture / lab
5	Methods for Solving Linear Systems	3	lecture / lab
6	Methods for Solving Linear Systems	3	lecture / lab
7	Interpolation and Polynomial Approximation	3	lecture / lab
8	Interpolation and Polynomial Approximation	3	lecture / lab
9	Curve Fitting	3	lecture / lab
10	Curve Fitting	3	lecture / lab
11	Numerical Integration	3	lecture / lab
12	Numerical Integration	3	lecture / lab
13	Methods for Solving Initial-Value Problems of Ordinary Differential Equations	3	lecture / lab
14	Methods for Solving Initial-Value Problems of Ordinary Differential	3	lecture / lab

	Equations		
15	Review	3	lecture / lab

ASSESSMENT APPROACH

Assessment method	% weight
1.Attendance (Class participation)	10%
2.Assignment	15%
3.Midterm exam	25%
4.Final exam	50%
Total	100 %

Guideline for Letter Grade:

Marks	Grade
93-100	A+
88-92	A
83-87	A-
78-82	B+
72-77	B
68-71	B-
63-67	C+
58-62	C
53-57	C-
50-52	D
49	F

Notes:

Students will be assessed on several assessment items (i.e. attendance, assignment, midterm exam and final exam.).

The attendance evaluates the student's participation of discussion in the classes. The assignment evaluates the student's ability to apply the knowledge to solve practical problem of numerical analysis.

The midterm exam and the final exam evaluate the student's understanding of the concepts of numerical analysis.

ADDITIONAL READINGS

Journals:

Trade and other Publications:

Website: