Department of Mathematics

College of Science

Salahaddin University-Erbil

Subject: Computational Mathematics II

Course Book: Second year – Second Course

Lecturer's name: Imad A. Aziz

Academic Year: 2022-2023

Course Book

1. Course name	Computational of Mathematics II
2. Lecturer in charge	Imad A. Aziz
3. Department/ College	Mathematics / Science
4. Contact	e-mail: imad.aziz@su.edu.krd Tel: +9647504639909
5. Time (in hours) per week	For example Theory: 2 Practical: 2
6. Office hours	
7. Course code	
8. Teacher's academic profile	**23/6/2020** lecturer at Department of Mathematics, College of Science, University of Salahaddin-Erbil, Iraq. **16/6/2020** Awarded Ph.D. in Mathematics, Department of Mathematics, College of Science, University of Salahaddin-Erbil, Iraq. **3/9/2006** Assistant lecturer at Department of Mathematics, College of Science, University of Salahaddin-Erbil, Iraq. **31/7/2006** Awarded M.Sc. in Mathematics, Department of Mathematics, College of Science, University of Al-Mustansiriyah, Iraq. **10/1/2002** Awarded B.Sc. in Mathematics, Department of Mathematics, College of Science, University of Salahaddin-Erbil, Iraq. **1995-1996** Awarded Baccalaureate, Hamren Secondary
9. Keywords	Matrix, Plot, Code programing, Script, Function.

10. Course overview:

The computer program MATLAB is a powerful tool which can help you solve a wide range of mathematical problems: it can differentiate, integrate, and otherwise manipulate mathematical formulas, perform arithmetic calculations, plot curves and surfaces in two and three dimensions, solve differential equations, and carry out a variety of other useful mathematical operations, At Rutgers, MATLAB is available on the student computer Eden. MATLAB is also available on the Windows PCs and Macintoshes in the public labs. Although the commands you use to do mathematics with MATLAB will be the same on all these machines, there are differences among computers, such as in the way that, les are opened, saved and printed.

With MATLAB, you can create powerful interactive documents. The MATLAB environment lets you start solving problems right away by entering expressions in 2-D Math and solving these expressions using point-and-click inter- faces. You can combine text and math in the same line, add tables to organize the content of your work, or insert images,

sketch regions, and spreadsheets. You can visualize and animate problems in two and three dimensions, format text for academic papers or books, and insert hyperlinks to other MATLAB files, Web sites, or email addresses. You can embed and program graphical user interface components, as well as devise custom solutions using the MATLAB programming language.

11. Course objective:

Matlab (Matrix laboratory) is an interactive software system for numerical computations and graphics. As the name suggests, Matlab is especially designed for matrix computations: solving systems of linear and non-linear equations, computing eigenvalues and eigenvectors, factoring matrices and so forth. In addition it, has a variety of graphical capabilities, and can be extended through programs written in its own programming language. Many such programs come with the system; a number of these extend Matlab's capabilities to nonlinear problems, such as the solution of initial value problems for ordinary deferential equations.

Matlab is designed to solve problems numerically, that is, in finite-precision arithmetic. Therefore it produces approximate rather than exact solutions, and should not be confused with a symbolic computation system SCS such as Mathematica or Maple. It should be understood that this does not make Matlab better or worse than an SCS; it is a tool designed for different tasks and is therefore not directly comparable.

12. Student's obligation
   a. Students reign an commitment to come on time and remain in the classroom for the duration of scheduled classes and Labs.
   b. Nothingness speak students with each other during lecture.
   c. All devices must be turned off.
   d. When teacher ask question, Students will be to raise your hand before answer his question.
   e. Students own an obligation to write tests and final examinations at the times scheduled by the teacher or the College.

13. Forms of teaching
I give hard copy of My lecture notes to students before coming lecturer time. first I remember students about previous lecture, and then I start new lecture. At the end of the lecture give a homework for the next lecture. During this proses I am use presentation and whiteboard.

14. Assessment scheme
   1. *Practical:* 35% Matlab assignments and quizzes in Lab.
   2. *Theoretical:* 15% (Midterm exams and other activities).
   3. *Final Exam: Practical:* 0% and *Theoretical:* 50% .

15. Student learning outcome:
Student learning in every facet of computational mathematics. Following are some commonly used mathematical calculations where it is used most commonly:

a. 2-D and 3-D Plotting and graphics

b. Linear Algebra

c. Algebraic Equations

d. Non-linear Functions

e. Statistics

f. Data Analysis

g. Calculus and Differential Equations

h. Numerical Calculations

i. Integration

j. Transforms

k. Curve Fitting

l. Various other special functions

16. Course Reading List and References:

- A Guide to MATLAB for Beginners and Experienced Users Second Edition, Brian R. Hunt, Cambridge, 2006.
- An Introduction to MATLAB, Winfried Auzinger, Vienna, 2002.
- Applied Numerical Methods Using Matlab, Won Young Yang, New Jersey, 2005.
- Learning MATLAB 7, The MathWorks, 2005.
- Numerical Analysis Using MATLAB and Spreadsheets, Second Edition, Steven T. Karris, Orchard Publications, 2004.

17. The Topics:	Lecturer's name
Chapter One: Graphics 2D Plotting, Polar Plots, 3D Plotting, Mesh and surface plots**.** **Chapter Two: The Symbolic Math Toolbox** Variable precision arithmetic, Symbolic substitution, Symbolic variables, Symbolic matrix operations. **Chapter Three: Calculus** Differentiation, Limits, Integration, Symbolic Summation, Taylor Series. **Chapter Four: Linear Algebra**	This Column are not applicable because timetables of holidays will change that is I cannot Determine a week by week review of the topics.

Eigenvalues, Solving Algebraic Equations, Solving linear system of equation, Symbolic linear algebraic functions, Solving algebraic equations **Chapter Five: Differential Equations** Differential Equation, Solving differential equations**,** solving system of differential equations	

18. Practical Topics (If there is any)

	This Column are not applicable because timetables of holidays will change that is I cannot Determine a week by week review of the topics.

19. Examinations:
   Questions in the examination will be arranged the matching mode by way of the examples and exercises that I give delivered in the lecture notes.
Sometimes will be have extra mark in examination for worthy students.

20. Extra notes:
Answers of examination will be find in the board's declaration Mathematics department after every examination.

21. Peer review