B.Sc. (Honours) Degree Program
Faculty of Applied Sciences
University of Sri Jayewardenepura

Course Title	**Computational Mathematics**
Course Code	**MAT 454 2.0**
Credit Value	02
Status	Core
Year / Level	Year 4
Semester	2
Theory: Practical: Independent Learning	30: 30: 40
Other: Pre-requisite Course/s	-

Aim of the Course:

To introduce students to the mathematical software packages Maple and MATLAB, and to provide students with a competency to apply those software as a tool for problem solving.

Intended Learning Outcomes:

On successful completion of this module, the student should be able to

1. visualize and present data attractively,

2. create procedures, scripts, and functions,

3. understand and apply basic programming techniques to numerical and symbolic mathematics problems.

Course Content:

1. **Introduction**
    1.1. Mathematical Software
    1.2. Maple
    1.3. MATLAB

2. Programming in Mathematical Software

3. Maple Procedures
    3.1. Defining and Executing a Procedure
    3.2. Procedure Components (Formal Parameters, Variables, Procedure Options/Description/Body Statements)
    3.3. Procedure Interpretation
    3.4. Procedure Return Values (Explicit Returns, Error Returns, Returning Values through Parameters)
    3.5. Formatting Code for Readability, Adding Comments, Including a Procedure Description

3.6. Saving and Retrieving Procedures

4. MATLAB Functions
      4.1. Basics of Structured Programming
      4.2. Basic Input and Output
      4.3. Flow of Control in a Program
      4.4. Writing MATLAB Functions

Scope and Schedule of Teaching - Learning Activities:

Topic No.	Topic / Sub Topic	No. of Hrs.			Teaching Method	Assessment Criteria	ILO Alignment
		T	P	IL			
1	**Introduction**						
1.1	Mathematical Software	2			Lecture / Handout 1		1
1.2	Maple	2	1	1			1
1.3	MATLAB	2	1	1			1
2	**Programming in Mathematical Software**	2	2	3	Lecture/ Handout 2		1
3	**Maple Procedures**						
3.1	Defining and Executing a Procedure	2	2	2		Assignment	2
3.2	Procedure Components (Formal Parameters, Variables, Procedure Options/Description/Body Statements)	2	2	2			2
3.3	Procedure Interpretation	2	2	2		Quiz	2
3.4	Procedure Return Values (Explicit Returns, Error Returns, Returning Values through Parameters)	2	2	3	Lecture/ Handout 3		2
3.5	Formatting Code for Readability, Adding Comments, Including a Procedure Description	2	2	3			2
3.6	Saving and Retrieving Procedures	2	2	3		Mid Exam	2
4	**MATLAB Functions**						
4.1	Basics of Structured Programming	2	2	5			1,3
4.2	Basic Input and Output	2	2	5	Lecture / Handout 4,5	Assignment	1,3
4.3	Flow of Control in a Program	2	4	5			1,3
4.4	Writing MATLAB Functions	4	6	5		Quiz and Mini Project	1,3
	Total	30	30	40			

Linking Program Outcomes with ILOs:

Program Outcomes:

1. Demonstrate advanced knowledge and understanding of underlying concepts of respective subject areas
2. Acquire high levels of competence in practical/technical knowledge and skills for professional growth
3. Enhance ability to communicate acquired knowledge, information, ideas and solutions with clarity and coherence.
4. Enhance emotional intelligence through social engagement, networking and teamwork which leads to improved leadership qualities, respect for diverse points of view and empathy and develop strategies to adapt to changing circumstances.
5. Develop cognitive and creative skills in identifying, collecting and critically analyzing data and in solving problems independently.

6. Exercise personal integrity through responsibility and accountability and acquire professional integrity through inculcated entrepreneurial, managerial and time-management skills.
7. Demonstrate positive and healthy attitudes and values and engage in lifelong learning for the betterment of society.

	PLO 1	PLO 2	PLO 3	PLO 4	PLO 5	PLO 6	PLO 7
ILO 1	***	*	*	*			*
ILO 2	***	***	*	*	***	***	*
ILO 3	***	***	*	**	***	***	*

*** - Strongly Linked; ** - Medium linked; * Weakly linked*

Mode of Assessment:

Formative Assessment (FA):   Continuous Assessment: Assignments, Quizzes, Mid Semester Exam and Mini Project = 40% of Total Marks

Summative Assessment (SA):   End Semester Examination: 2-hour paper = 60% of Total Marks

References

- MATLAB Programming by David C. Kuncicky

- MATLAB Programming for Engineers by Stephen J. Champan

- Maple Programming Guide by L. Bernardian, P. Chin, etc.

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