DEPARTMENT OF MATHEMATICS

Semester : VII	Integrated M.Sc. Mathematics	Academic Year : 2019-20
	Subject : 060090107 GE1Principles of Scientific Computing	

Teaching Schedule

Course Objectives: To give comprehensive knowledge of Octave programming language and its implementation in scientific problem solving techniques.

Course Outcomes: Upon completion of the course, students shall be able to

CO1: understand the basic concepts of mathematical computer programming.

CO2: become familiar with syntax related to concepts of matrix theory.

CO3: design and develop programs using different logical statements viz. if, for, while, do until etc.

CO4: plot 2D and 3D graphs of data using mathematical computer programming.

CO5: increase capacity with the major programming paradigms, and the principles and techniques involved in design and implementation of mathematical programming languages.

Unit	Sub Unit	No. of Lect.(s)	Topics	Reference Chapter/ Additional Reading	Teaching Methodology to be used	Active Learning Activities	Evaluation Parameter
Unit 1: Basic elements of the language							
[08]	1.1	2	Creating real variables	Ch#1,2 GNU Octave Beginner's guide Jesper Schmidt Hansen	Chalk & Talk/ Presentation	**For Slow Learner:** Students must write answer of question(s) given by teacher after completion of each method and verified by teacher to resolve any query of students. **For Active Learner:** Student will solve exercise given in book after completion of Unit.	Unit Test -1 Assignment-1
	1.2	2	Elementary mathematical functions				
	1.3	2	Complex numbers				
	1.4	2	Integers, Floating point integers, Strings				

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Unit 2: Matrices

[08]	2.1	2	Create a matrix of real values	Ch# 2 GNU Octave Beginner's guide Jesper Schmidt Hansen	Chalk & Talk/ Presentation	**For Slow Learner:** Students must write answer of question(s) given by teacher after completion of each method and verified by teacher to resolve any query of students. **For Active Learner:** Student will solve exercise given in book after completion of Unit.	Unit Test -1 and 2 Assignment-2
	2.2	2	Empty matrix, Query matrices				
	2.3	2	Element wise operations, Multiplication of two vectors				
	2.4	1	Conjugate transpose and nonconjugate transpose				
	2.5	1	Comparing two real matrices				

Unit 3: Looping and Branching

[07]	3.1	3	If statement, select statement	Ch# 4 GNU Octave Beginner's guide Jesper Schmidt Hansen	Chalk & Talk/ Presentation	**For Slow Learner:** Students must write answer of question(s) given by teacher after completion of each method and verified by teacher to resolve any query of students. **For Active Learner:** Student will solve exercise given in book after completion of Unit.	Unit Test -2 Assignment-2
	3.2	2	For statement, while statement				
	3.3	2	Break and counting statement				

Unit 4: Functions & plotting

[07]	4.1	1	Defining a function	Ch# 3 GNU Octave Beginner's guide Jesper Schmidt Hansen	Chalk & Talk/ Presentation	**For Slow Learner:** Students must write answer of question(s) given by teacher after completion of each method and verified by teacher to resolve any query of students.	Internal Examination Assignment-2
	4.2	2	Function libraries				

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	4.3	2	The return statement			**For Active Learner:** Student will solve exercise given in book after completion of Unit.	
	4.4	2	2D plot, 3D plot, Contour plots				

Text book:

1. Jesper Schmidt Hansen, GNU Octave Beginner's guide, Packt publishing, 2011.

Reference books:

1. Amos Gilat, Matlab An introduction with applications, Wiley India,2004
2. Shoichiro Nakamura, GNU OCTAVE PRIMER FOR BEGINNER

Course Objectives and Course Outcomes Mapping:

- To give comprehensive knowledge of computer programming language: CO1, CO2, CO4.
- Its implementation in scientific problem solving techniques: CO3,CO5.

Course Units and Course Outcomes Mapping:

Unit No.	Unit	Course Outcomes				
		CO1	**CO2**	**CO3**	**CO4**	**CO5**
1	**Basic elements of the language**	✓				✓
2	**Matrices**		✓			✓
3	**Looping and Branching**			✓		✓
4	**Functions & plotting**				✓	✓

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Programme Outcomes (PO)

PO1: Knowledge

Provides knowledge about the fundamentals of pure, applied and computing mathematics and its applications to students that creates the opportunities in industries and research centers.

PO2: Core Competence

Creates competency in science and mathematics to formulate, analyses and solve problem and/or also to pursue advanced study or research.

PO3: Breadth

Trains students having good knowledge in unearth core of academia and industry by the roots of mathematics.

PO4: Evaluation

Imparts in students to raise trial and error-based curiosity and problem-solving functionality with research based advanced tutorial for higher level decision makings tools.

Programme Outcomes and Course Outcomes Mapping:

Programme Outcomes	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
PO1	✓	✓	✓	✓	
PO2		✓	✓	✓	✓
PO3			✓		✓
PO4					✓