B.Sc. DEGREE PROGRAMME

MATHEMATICS (CORE COURSE)

SECOND SEMESTER

(w.e.f. 2010 admn.)

MM2B01 : INFORMATICS AND MATHEMATICAL SOFTWARES

4 hours/week   **4 credits**   **30 weightage**

Aim of the course

To update and expand basic informatics skills and attitudes relevant to the emerging knowledge society and also to equip the students to effectively utilize the digital knowledge resources for their chosen courses of study.

Objectives of the course

1.   To review the basic concepts & functional knowledge in the field of informatics.

2.   To review functional knowledge in a standard mathematical packages and utilities.

3.   To impart skills to enable students to use digital knowledge resources in learning.

4.   To propagate importance of the use of open source softwares.

Course Contents

The course has Theory Part and Practical Part. Theory include:

1.   Introduction of the software

2.   Purpose and aim of the software

3.   Study about the area of Mathematics it is being used.

4.   The procedure to use the software.

5.   Theory related with syntax involved.

6.   Use of the software in mathematical situations.

The University will conduct the theory examination of 3 hour duration. Practical examination of one hour duration should be conducted internally and should be considered for internal evaluation. For internal evaluation one of the three tests should be a practical examination. Students should keep practical records. Half of the time allotted for the course is to be dedicated to practicals.

Practical Part

Students will be developing skills in these softwares by doing practicals. Teacher will demonstrate the software. Students will be given mathematical situations to use the software to handle it. Practicals will be restricted to using the theory in the context of mathematics.

Syllabus

Text Book :-Python for Education-Learning Maths and Physics using Python and writing them in Latex - Dr.Ajith Kumar B.P.
(free download from www.iuac.res.in/phoenix)

Module I(24 hrs.)
1.   Introduction
Hardware Components, Software components, The user interface,
High Level Languages
(sections 1.1 to 1.4of the Text.)

2. Programming in Python
Getting started with Python, Variables and Data Types, Operators and their Precedence, Python Strings, Python Lists, Mutable and Immutable Types, Input from   the Keyboard, Iteration: while and for   loops, Conditional Execution: if, elif and else,Modify loops:break and continue, Line   joining,Functions, More on Strings and Lists, Python Modules, File Input/Output,Formatted printing, Exception Handling.
(sections 2.1 to 2.18 of the text)

Module II(18 hrs.)
1. Arrays and Matrices
The NumPy Module, Vectorized Functions
(sections 3.1 and 3.2 of the Text)

2. Numerical methods

Polynomials,Finding roots of an equation, Equation solving using matrices.
   (sections 6.4 to 6.6 of the Text)

Module III(15hrs.)
 Data visualization

The Matplotlib Module, Plotting mathematical functions, Famous Curves, 2D plot using colors,Meshgrids,3D Plots
   (sections 4.1 to 4.3, 4.6,4.8 and 4.9 of the Text)

 Module IV(15hrs.)
 Typesetting using Latex

 Document classes,Modifying Text,Dividing the document,Environments,Typesetting Equations,   Arrays and matrices.
 (sections 5.1 to 5.6 of the Text)

References: (1) Python Tutorial Release 2.6.1 by Guido Van Rossum ,Fred L Drake.Jr.
                 (free download from
http://www.altway.com/resources/python/tutoria.pdf)

                (2)http://www.scipy.org/Numpy_Example_List

                (3)http://docs.scipy.org/doc/

                (4)Latex-User's Guide and Manual-Leslie Lamport.(Pearson Education)

                (5)Informatics and mathematical software-Part II
                   -An Introduction to Python and Latex-Pramod C.E
                   (Calicut University Central Co-op Stores)