ADD ON COURSE

IN

MATHEMATICAL SOFTWARES - MTADMS

Syllabus

Duration : 50 hrs

Aim of the course:

To update and expand basic programming skills and attitudes relevant to the emerging and evolving knowledge society and to equip the students with digital knowledge required in the field of Mathematics.

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 soft wares.
5. To understand the logic of programming.
6. To impart programming skills using C++.
7. To learn the basics of Python.
8. To analyze data with the help of statistical software R.
9. To familiarize mathematical graphing software like Geobera.
10. To familiarize with typesetting platform LATEX.

Beneficiaries: Intended for Third and Fifth semester students

Module I **(10 hrs.)**

C++ Programming What is C++ C vs C++ C++ History C++ Features C++ Installation C++ Program C++ cout, cin, endl C++ Variable C++ Data types C++ Keywords C++ Operators C++ Control Statement C++ if-else C++ switch C++ For Loop C++ While Loop C++ Do-While Loop C++ Break Statement C++ Continue Statement C++ Goto Statement C++ Comments C++ Functions C++ FunctionsCall by value & reference C++ Recursion C++ Storage Classes C++ Arrays C++ One dimensional Arrays C++ Multidimensional Arrays C++ Pointers C++ Pointers C++ Object Class C++ OOPs Concepts, C++ Object Class C++ Constructor C++ Destructor C++ this Pointer C++ static C++ Structs C++ Enumeration C++ Friend Function C++ Inheritance C++ Inheritance C++ Aggregation C++ Polymorphism C++ Polymorphism C++ Overloading C++ Overriding C++ Virtual Function C++ Abstraction C++ Interfaces.

Module II **(15 hrs.)**

Python Python Introduction, Syntax ,Variables, Numbers , Casting, Strings, Operators , Lists Tuples, Sets ,Dictionaries, Conditions While Loops, For Loops ,Functions ,Lambda, Arrays Python Classes/Objects Modules ,Dates JSON, PIP File Handling, File Handling Read Files Write/Create Files, Python Delete Files, MySQL MySQL, introduction MySQL, Create Database MySQL Create Table,, MySQL Insert, MySQL Select ,MySQL Where, MySQL Order By MySQL Delete, MySQL Drop Table ,MySQL Update, MySQL Limit, MySQL Join.

Module III **(15hrs.)**

R - Overview • R - Environment Setup • R - Basic Syntax • R - Data Types • R - Variables • R - Operators • R - Decision Making • R - Loops • R - Functions • R - Strings • R - Vectors • R - Lists • R - Matrices • R - Arrays • R - Factors • R - Data Frames • R - Packages • R - Data Reshaping • R - CSV Files • R - Excel Files • R - Binary Files • R - XML Files • R - JSON Files • R - Web Data • R - Database • R - Mean, Median & Mode • R - Linear Regression • R - Multiple Regression • R - Logistic Regression • R - Normal Distribution • R - Analysis of Covariance • R - Time Series Analysis • R - Decision Tree • R - Random Forest • R - Chi Square Test • Data visualization, Introduction to 88 plots • Basic statistical function: Parametric and Non parametric: • Depression SLR: Residual Analysis. •Generation of Random Numbers. Distributions, Estimation-MLE/Moments.

Module IV **(10hrs.)**

Typesetting using Latex

Basics of Geogebra

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. Latex-User's Guide and Manual-Leslie Lamport.(Pearson Education)
3. Informatics and mathematical software-Part II -An Introduction to Python and Latex-Pramod C.E (Calicut University Central Co-op Stores)
4. 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) .
5. https://wiki.geogebra.org/en/Manual
6. LATEX for Beginners: http://www.docs.is.ed.ac.uk/skills/documents/3722/3722-2014.pdf