SEC COURSE

Semester: III(FYUGP)
Course Name: Progamming in Mathematica
Credits:3
Credit Distribution: 2(Theory) + 1 (Practical),
2 lectures, 1practical per week

Content :

Course Objectives: This course aims at familiarizing students with the usage of theComputer Algebra System **Mathematica**. The basic emphasis is on plotting andworkingwith matricesusing Mathematica.

Course Learning Outcomes: This course will enable the students to:

1. UseMathematica asacalculatorandforplottingfunctionsand animations.
2. Use Mathematica for various applications of matrices such as solvingsystemof equationsandfindingeigenvaluesandeigenvectors.

Unit1(1Credit):IntroductiontoCAS(Mathematica): ComputerAlgebraSystem(CAS),UseofMathe maticaasacalculator,Computingandplottingfunctions in 2D, Plotting functions of two variables using Plot3D and Contour Plot,Plotting parametric curves surfaces, Customizing plots, Animating plots, Producingtablesof values,Workingwithpiecewise definedfunctions,Combininggraphics.

Unit 2 (1 Credit): Working with Matrices: Simple programming in Mathematica,Performing Gauss elimination, Operations (transpose, determinant, inverse), Minorsand cofactors, Working with large matrices, Solving system of linear equations,Rankandnullityofamatrix,Eigenvalue, Eigenvector anddiagonalization.

Practical(1Credit): Sixpracticalsshouldbedonebyeachstudent.Theteachercanassignpractical fromtheexercises from[1]and[2].

2. **Recommendedbooks** :
   1. Bindner, Donald & Erickson, Martin. (2011). A Student's Guide to the Study,Practice, and Tools of Modern Mathematics. CRC Press, Taylor & FrancisGroup,LLC.
   2. Torrence, Bruce F., &Torrence, Eve A. (2009). The Student's Introduction toMathematica: A Handbook for Precalculus, Calculus and Linear Algebra (2nded.).CambridgeUniversity Press

3. **PaperOfferedby**   :B. Borooah College, Guwahati-07