![Image of a page from a document containing a table with course codes, titles, and credits for B. Sc. MATHEMATICS at JECRC University. The table is divided into six semesters, each listing course codes, titles, and credits. The table is well-formatted with clear headings and rows for each semester.](image-url)
Syllabi for B.Sc. Mathematics Courses

Semester –I

MAT-101 Numerical Analysis and Algebra

Credits : 04

Numerical Analysis

Algebra :

Recommended Books:

(Practical): Mathematics Lab-1

Credits : 01

Students are required to familiarize themselves with popular software like MATLAB, MATHEMATICA, for numerical computation. The department will decide the topic of practical at the beginning of the session. Few topics are given below for reference. (Application problems are to be taken).
1. Numerical differentiation
2. Partial Differentiation
3. Tracing of Curves (Cartesian and Polar)
4. Matrix Operations using Matlab
References:
MATLAB- High Performance numeric computation and visualization software.
MATHEMATICA- Stephen Wolfram, Cambridge

Semester –II

MAT201  Dynamics and Calculus  Credits : 4

Dynamics: Rotation of a vector in a plane. Velocity and acceleration components in Cartesian, polar and intrinsic systems. Central orbit, Kepler’s laws of motion, rectilinear simple harmonic motion. Vertical motion on circular and cycloidal curves. Motion with respect to linearly moving and rotating plane. Coriolis force and centrifugal force.

Calculus: Functions of Two Variables: Limit, Continuity, Differentiability. Partial differentiation, Change of variables, Euler’s, Taylor’s theorem. Maxima and minima. Double and triple integrals, Change of order in double integrals. Beta and Gamma functions
Vector Calculus: Gradient, Divergence and Curl. Greens, Stokes and Gauss Theorems with applications.

Recommended Books:


MAT 202  Credits : 01
( Practical ) Mathematics Lab-II

Following topics given below will be taken up using Matlab and Mathematica Softwares.
1. Numerical integration
2. Finding Area and Volume using Integration
3. Differentiation and Integration of Vector point functions.
4. 2-D and 3-D graphics.( Spheres, Cone, Cylinder)

References:
MATLAB- High performance numeric computation and visualization software.
MATHEMATICA- Stephen Wolfram, Cambridge.
Semester –III

MAT 301  Differential Equations  Credits : 4
Ordinary differential equations of first order: initial and boundary conditions, homogeneous equations, linear equations, Exact differential Equation. First order higher degree equations solvable for x, y, p. Singular solution and envelopes.
Linear differential equations with constant coefficients, homogeneous linear differential equations, linear differential equations of second order with variable coefficients.

Recommended Books:

MAT 302  (Practical) Mathematics Lab-III  Credits : 01
Following topics given below will be taken up using Matlab and Mathematica Softwares.
1. Solving Differential Equations
2. Solving Partial Differential Equations
3. Limits and Convergence
References:
MATLAB- High performance numeric computation and visualization software.
MATHEMATICA- Stephen Wolfram, Cambridge.

Semester –IV

MAT 401  Partial Differential Equations  Credits : 4
Linear partial differential equations of first order. Non linear PDE of first order: Charpit’s method.
Linear partial differential equation of second and higher order of homogeneous and non homogeneous forms with constant coefficients. Second order PDE with variable coefficients. Monge’s method. Solution of heat and wave equations in one and two dimensions by method of separation of variables.
**Recommended Books:**


**MAT 402 (Practical) Mathematics Lab-IV**

**Credits : 01**

Project:
Following topics given below will be taken up using Matlab and Mathematica Softwares.

1. Centre of gravity by integration: C.G of plane area, arc, surface and solid of revolution
2. Solving Differential Equations obtained in planetary motions and Simple Harmonic Motions

References :
MATLAB- High performance numeric computation and visualization software.
MATHEMATICA- Stephen Wolfram , Cambridge.

**Semester –V**

**MAT 501 Analysis**

**Credits : 4**


**Recommended Books:**


**MAT 502**

*Practical* **Mathematics Lab-V**

Following topics given below will be taken up using Matlab and Mathematica Softwares.

1. Numerical differentiation
2. Numerical Integration
3. Solving simultaneous equations of more than three variables

**References:**

MATLAB- High performance numeric computation and visualization software.

MATHEMATICA- Stephen Wolfram, Cambridge.

**Semester –VI**

**MAT 601 Linear Algebra**

*Credits : 4*


Inner product spaces, Cauchy-Schwarz inequality, orthogonal vectors. Orthonormal basis, Bessel’s inequality, Gram-Schmidt orthogonalization process.

**Recommended Books:**

MAT 602  
(Practical ) Mathematics Lab-VI
Following topics given below will be taken up using Matlab and Mathematica Softwares.
1. Complex Plane: Complex curves and Region in Complex plane
2. Complex Integration
3. Singularities, Poles and Residues
References:
MATLAB- High performance numeric computation and visualization software.
MATHEMATICA- Stephen Wolfram, Cambridge.