

DETAILS OF B Sc PROGRAMME

Mathematics : Semester-1

Course : CC MAT-111

UNIT 1: Successive differentiation:

Successive Derivatives, Some standard results for n^{th} derivatives, Leibnitz's Theorem and its examples. Cauchy's Mean Value Theorem. Taylor's Theorem (without proof), power series of $\sin x, \cos x, e^x$. Maclaurian's series and its examples. Expansion of

UNIT 2: Integration:

Reduction formula $\int_0^{\pi/2} \sin^n \theta d\theta$ $\int_0^{\pi/2} \cos^n \theta d\theta$ $\int_0^{\pi/2} \sin^m \theta \cos^n \theta d\theta$, $m, n \in \mathbb{N}$.

Application of definite integrals to (a) Summation of the series (b) Rectification (c) Surface and volume revolution.

UNIT 3:

(a) Vector analysis : scalar and vector product of three vectors, product of four vectors, reciprocal vectors, vector differentiation, gradient, divergent and curl.
(b) Polar co-ordinates, spherical and cylinder coordinates and their relations.

UNIT 4: Sphere, Cone and Cylinder and introduction to Conicoids:

(a) **Sphere:** plane section of sphere, intersection of two sphere, intersection of sphere and line, power at a point, tangent plane and normal. Plane of contact, angle of intersection of two spheres, condition of orthogonality.

(b) Cone and cylinder:

Definition of cone, vertex, guiding curve, generators, equation of a cone with a given vertex and a guiding curve, right circular cone with given vertex, axis and semi vertical angle.

Definition of a cylinder, equation of a cylinder whose generators intersect a given cone and are parallel to a given line, equation of a right circular cylinder.

(c) Conicoid: Standard equation of ellipsoid, hyperboloid of one and two sheets, Elliptic paraboloid and hyperbolic paraboloid.

Reference Books:

- (1) Differential Calculus, by Shantinayakan.
- (2) Integral Calculus, by Shantinayakan.
- (3) Vector Analysis, by Murry R. Spiegel.
- (4) Vector Analysis, by Dr.K.S.Rawat, SARUP & SONS, DELHI
- (5) Introduction to Vector Analysis, Fifth Edition, by Herry F. Davis, Arther David Saider

Course : PC MAT-111

UNIT 1 Introduction to Excel using Computer in a computer laboratory.

(i) Simple calculation through Excel ,(iii) Graphical Presentation of Trigonometric functions, Inverse Trigonometric functions and hyperbolic Trigonometric functions, logarithmic functions, polynomial functions through Excel

UNIT 2: Practical based on successive differentiation, Cauchy Mean value theorem, Taylor's & Meclurian's theorem,

UNIT 3: Practical based on integral and reduction formula, Summation of the series, Rectification , surface & volume.

UNIT 4 : Practical based on Sphere, Cone, Cylinder, Application of gradient, divergent and curl.

List of Practicals :

Unit:1 (1) Draw the graph of $\sin x, \cos x, \tan x, \cot x, \sec x, \operatorname{cosec} x$.

(2) Draw the graph of $\sin^{-1} x, \cos^{-1} x, \tan^{-1} x, \cot^{-1} x, \sec^{-1} x, \operatorname{cosec}^{-1} x$.

(3) Draw the graph of $\sinh x, \cosh x, \tanh x, \coth x$.

(4) Draw the graph of $\log_a x$ & a^x , $a \in \mathbb{R}^+ - \{1\}$.

(5) Draw the graph of cardioids, asteroid.

Unit:2 (1) Find the n^{th} derivative of the given function at given point.

(2) Application of Leibnitz theorem.

(3) Application of Cauchy Mean value theorem.

(4) Application of Taylor's theorem.

(5) Application of Maclurain theorem.

Unit:3(1) Application of Reduction formula for integration.

(2) Summation of series using integration.

(3) Application of rectification by using integration.

(4) Application of surface revolution using integration.

(5) Application of volume revolution.

Unit:4(1) Application of gradient & divergent.

(2) Application of curl. (3) Application

on Sphere.

(4) Application on Cone.

(5) Application on Cylinder.

Reference Book:

Excel Guide for Finite Mathematics and Applied Calculus by Revathi Narasimhan

Publisher: Houghton Mifflin Company; 7 edition

Course :PC MAT-111

Instructions: Strictly follow the instructions given by examiner(s)

Draw the graphs any two out of three from

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| 1. unit-I | (10 Marks) |
| 2. Attempt any two out of three from unit-II | (10 Marks) |
| 3. Attempt any two out of three from unit-III | (10 Marks) |
| 4. Attempt any two out of three from unit-VI | (10 Marks) |
| 5. (a) Viva | (5 Marks) |
| (b) Journal | (5 Marks) |