B.Sc. Programme
CBCS-Semester-Grading pattern
Mathematics : Semester-1
CC MAT-111
[In force from june 2011]

<u>**UNIT 1**</u>**: Successive differentiation:**
   Successive Derivatives, Some standard results for n^{th} derivatives, Leibnitz's Theorem
   and its examples. Cauchy's Mean Value Theorem.
   Taylor's Therom (without proof),
   Maclaurians series and its examples.Expansion of   power series of sinx,cosx,e^x.

<u>**UNIT 2**</u>**: 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$\in$N.

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

<u>**UNIT 3**</u>**:**
   (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.

<u>**UNIT 4**</u>**: 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) Concoid: Standard equation of ellipsoid, hyperboloid of one and two sheets, Elliptic
       paraboloid and hyperbolic paraboloid.

Reference Books:

 (1) Differential Calculus, by Shantinarayan.
 (2) Integral Calculus, by Shantinarayan.
 (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

B.Sc. Programme
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UNIT 1 : Practical based on tracing curves (Trigonometric function , Inverse function, Exponential function, Logrithmic function, Hyperbolic function)

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, secx, cosecx .

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

(3) Draw the graph of sinh x, cos hx, tan hx, cot hx.

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

(5) Draw the graph of cardioids, asteroid.

Unit:2 (1)Find the nth derivative of the given function at given point.

(2)Application of Leibnitsz theorem.

(3) Application of Cauchy Mean value theorem.

(4) Application of Taylor's theorem.

(5) Application of Maclurain theorem.

Unit:3(1)Appication of Riduction formula for integration.

(2)Summetion of series using integration.

(3) Appication of rectification by using integration.

(4) Appication of surface revolution using integration.

(5) Appication of volume revolution.

Unit:4(1) Application of gradient 7 divergent.

(2) Application of curl.

(3)Appication on Sphere.

(4) Appication on Cone.

(5) Appication onCylinder.

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

1. Draw the graphs any two out of three from 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)

B.Sc. Programme
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Mathematics : Semester-2
CC MAT-122
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UNIT-1. De'Morve's theorem and its applications, (a) Roots of a complex number

(b) Application of Expansion of $\sin^n\theta, \cos^n\theta$, $n\in N$ in terms of sine and cosine of

multiples of θ. (C)Expansion of $\sin n\theta$, $\cos n\theta$ and $\tan n\theta$ in terms of sine, cosine and

tangent. respectively.

UNIT -2. (a) Exponential, Circular and hyperbolic function, Logarithmic and inverse

functions. (b) Sequence and series: Definition of sequence, series. Definition of

convergence of sequence and series, partial sum, comparison test, ratio test, root test

and its examples.

UNIT -3. (a) Linear differential equation $\frac{dy}{dx} + Py = Q$, P and Q are functions of x,

Bernoulli's differential equation. (b)Differential equation of first order and higher

degree solvable for s, solvable for y, solvable for P=$\frac{dy}{dx}$.

(c) Solution of Clairaut's and Lagrange's differential equation.

(d) Linear differential equation with constant coefficients.

UNIT -4. Matrices:

Introduction of matrices, different types of matrices, operations on matrices,

theorems on matrices, Symmetric and skew -symmetric matrices, Hermitian and skew-

Hermitian matrices, linear dependence and independence of row and column matrices.

Row rank, Column rank and rank of matrix, Roe reduced Echelon form of a matrix and

matrix inversion using it.

Reference Books:

(1) Complex Variables and Appiication, by Ruel V. Churchill & James Ward Brown, McGraw-Hill Publishing Company, New Delhi.

(2) Complex Analysis, by J.V.DESHPANDE, Tata McGRAW-Hill Publishing Co. Ltd. New Delhi.

(3) Theory of Matrices, by B.S.Vatssa, 2nd Edition, Wiley Easterns Ltd.

(4) Matrix Operations, by Schaum's Series McGRAW-HILL Book Co.

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Mathematics : Semester-2
PC MAT-122
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List of Practicals:

Unit:1(1) Application of De'Morve's theorem.

(2) Application of roots of complex number.

(3) Application of $\sin^n\theta$ and $\cos^n\theta$ in terms of series of sine and cosine respectively.

(4) Application of $\sin n\theta$ and $\cos n\theta$ in terms of series of sine and cosine.

(5) Application of $\tan n\theta$ in terms of series of tangent.

Unit:2(1) Application of Exponential, Circular and hyperbolic function

(2) Application of inverse hyperbolic function and logarithm function of a complex number.

(3) Application of comparison test for a given sequence.

(4)Application of root test for a given sequence.

(5) Application of ratio test for a given sequence.

Unit:3(1) Application of linear differential equation $\frac{dy}{dx} + Py = Q$, where P and Q are function of x.

(2) Application of Bernoully's differential equation.

(3) Application of differential equation in first order and higher degree solvable for x, y and p, where $p = \frac{dy}{dx}$.

(4) Application of clairant's differential equation

(5) Application of linear differential equation with constant coefficients.

Unit:4(1)Solution of simultaneous linear equations using matrices.

(2)Application of the inverse matrix by row reduction method.

(3)Application of the rank of a matrix.

(4)Application of the rank of a matrix by transforming into echelon form.

(5) Application of Hermitian and skew-Hermitian matrices.

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Mathematics : Semester-2
PC MAT-122
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Instructions: Strictly follow the instructions given by examiner(s)

1. Attempt any two out of three from 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)

B.Sc. Programme
CBCS-Semester-Grading pattern

List of Elective (Mathematics Subject) Course

(Credits-2)

1. **Mathematical Programming In 'C' Language**
2. **Industrial Mathematics- I**
3. **Busines Mathematics-I**
4. **Industrial Mathematics- II**
5. **Busines Mathematics-II**

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ES MAT-111
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Mathematical Programming In 'C' Language

Unit 1

- Importance of "C" programming

- Constants, Variables, Data Types

- Operators & Expressions

- Decision Making & Branching

Unit 2

- Simple if statement

    If else statement

    Switch statement

    Conditional – Operator Statement

    Go to statement

- Decision making & looping

- While statement

    Do-while statement

    For statement

Reference Books :

1. Programming in ANSI C

    E Balagurusamy

    Tata Magraw – Hill Publication

2. Let USC J.Y. Kanetkar BPB Publication YK

B.Sc. Programme
CBCS-Semester-Grading pattern
Mathematics : Semester-1
ES MAT-112
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Industrial Mathematics- 1

Unit : I

- Introduction to game theory
- Two-person zero sum theory
- Pure strategies' (Minmax and maxmin principles)
- Mix strategies
- Game with saddle point
- Rules to determine saddle point
- Game without saddle point
- Dominance principles solution of n á 2 and 2 á n game graphically

Unit : II

- Introduction to replacement problem
- Type of failure
- Replacement of items whose efficiency deteriorates with time
- Replacement of items that completely fail

Reference Books:

1. Operations Research Theory & Application
   J.K.Sharma
   4 th Edition Macmillan Pub. India Ltd.
2. Operations Research
   Kanti swarup , Gupta P.K. , Manmohan
   Sultan Chand & Sons,New Delhi
3. Operations Research ;PHI
   Shah,Gor,Soni