REVISED CURRICULUM FOR

I - IV Semester B. Sc. Mathematics

YEAR OF IMPLEMENTATION: 2025-26

TUMKUR UNIVERSITY

VISHVAVIDYANILAYA KARYALAYA,

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2025

CURRICULUM STRUCTURE FOR UNDERGRADUATE DEGREE PROGRAM

Name of the Degree Program : B. Sc.
Subject : Mathematics
Year of Implementation : 2025-26

ASSESSMENT

Weightage for the Assessment (in percentage)

Type of Course	Formative Assessment (I. A.)	Summative Assessment (S.A.)
Theory	80%	20%
Practical	80%	20%

CONTENT OF COURSES FOR B. Sc. MATHEMATICS

FOR FIRST - FOURTH SEMESTER

Semester	Course No.	Theory / Practical	Credits	Paper Title	Marks	
					S. A.	I. A.
I	MATDSCT1.1	Theory	4	Mathematics - I	80	20
	MATDSCP1.1	Practical	2	Theory based Lab on Mathematics - I	40	10
II	MATDSCT2.1	Theory	4	Mathematics – II	80	20
	MATDSCP2.1	Practical	2	Theory based Lab on Mathematics - II	40	10
III	MATDSCT3.1	Theory	4	Mathematics – III	80	20
	MATDSCP3.1	Practical	2	Theory based Lab on Mathematics – III	40	10
	MATDSE3.1	Theory	3	Applied Mathematics	80	20
IV	MATDSCT4.1	Theory	4	Mathematics – IV	80	20
	MATDSCP4.1	Practical	2	Theory based Lab on Mathematics – IV	40	10
	MATDSE4.1	Theory	3	Number Theory	80	20

Syllabus for B. Sc. Mathematics

SEMESTER – I

MATDSCT1.1: Mathematics - I	
Teaching Hours : 4 Hours/Week	Credits: 4
Total Teaching Hours: 60 Hours	Max. Marks: 100 (S. A. – 80 + I. A. – 20)

Course Learning Outcomes: This course will enable the students to

- Recall basic matrix operations and properties and remember formulae of higher order derivatives of standard functions.
- Interpret the relationship between polar and Cartesian coordinates.
- Classify and apply the different methods of solving first-order ODEs.
- Understand the geometric properties of curves based on their equations.
- Learn the fundamentals of Maxima.
- Understand the methods of solving problems on matrices, system of linear equations and successive differentiation using Maxima.

Unit-I: Matrices and solution to system of linear equations **15 Hours**

Elementary row and column operations, row reduced echelon form of a matrix, equivalent matrices, rank of a matrix and applications, invariance of rank under elementary operations, determination of rank of a matrix by row reduced echelon form, homogeneous and non-homogeneous systems of linear equations, consistency and inconsistency, criteria for existence and uniqueness of solutions to systems of linear equations.

Eigen values and eigen vectors of a square matrix, standard properties, Cayley-Hamilton theorem and applications, matrix diagonalization using eigen values (only for 2X2 matrices).

Unit-II: Successive Differentiation and Polar Co-ordinates **15 Hours**

n^{th} order derivatives of standard functions – $e^{ax+b}, (ax+b)^m, \log(ax+b), \sin(ax+b), \cos(ax+b), e^{ax}\sin(bx+c), e^{ax}\cos(bx+c)$, Leibnitz theorem and its applications.

Introduction to polar co-ordinate system - angle between the radius vector and the tangent, angle between two polar curves, polar sub tangent and polar sub normal, length of the perpendicular from pole to the tangent, pedal equations.

Unit-III: Tracing of curves **15 Hours**

Derivative of an arc in Cartesian, polar and parametric forms, radius of curvature in Cartesian, polar, parametric and pedal forms, centre of curvature, evolutes, asymptotes, envelopes.

Tracing of Cartesian and polar curves – Cissoid, Strophoid, Witch of Agnesi, Lemniscate of Bernoulli, Cardioid, three leaved rose.

Unit-IV: Ordinary differential equations of first order **15 Hours**

Recapitulation of ordinary differential equations of first order - variables-separable method, homogeneous and linear differential equations and equations reducible to linear form.

Solution to exact differential equations, equations reducible to exact form, first order higher degree differential equations solvable for x, y and p. Clairaut's form and singular solutions, orthogonal trajectories.

Total differential equations – necessary and sufficient condition for the equation $P\,dx + Qdy + Rdz = 0$ to be exact, Simultaneous differential equations of the form $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$.

Reference Books:

1. University Algebra – N S Gopala Krishnan, New Age International (P) Limited.
2. Theory of Matrices - B S Vatsa, New Age International Publishers.
3. Matrices - A R Vasista, Krishna Prakashana Mandir.
4. S. Narayan and P.K. Mittal, Text book of Matrices, 10th ed. New Delhi: S. Chand and Co. Ltd, 2004.
4. Differential Calculus - Shanti Narayan, S. Chand & Company, New Delhi.
5. Applications of Calculus, Debasish Sengupta, Books and Allied (P) Ltd., 2019.
6. Calculus – Lipman Bers, Holt, Rinehart & Winston.
7. Calculus - S Narayanan & T. K. Manicavachogam Pillay, S. Viswanathan Pvt. Ltd.,vol. I & II.
8. Schaum's Outline of Calculus - Frank Ayres and Elliott Mendelson, 5th ed. USA:Mc. Graw Hill.
9. Ordinary and Partial Differential Equations, M D Raisinghania, S. Chand, Delhi, 2020.
10. Schaum's Outline of Differential Equations – R Bronson and G Costa, 4th Edition, 2014.

MATDSCP1.1: Theory based Lab on Mathematics – I using Maxima	
Teaching Hours : 4 Hours/Week	Credits: 2
Total Teaching Hours: 60 Hours	Max. Marks: 50 (S.A. – 40 + I.A. – 10)

Practical/Lab Work to be performed in Computer Lab:

1. Introduction to Maxima and its standard commands .
2. Basic operations on matrices – Addition, Subtraction and Multiplication.
3. Computation of the rank of matrix and row reduced echelon form.
4. Solving systems of homogeneous and non-homogeneous linear equations.
5. Solving problems related to Cayley-Hamilton theorem.
6. Finding the n^{th} derivatives of standard functions.
7. Finding the angle between the radius vector and tangent.
8. Finding the angle between two polar curves.
9. Solution to first order Ordinary Differential Equations and plotting the solution.
10. Solving total and simultaneous differential equations.
11. Finding the curvature and radius of curvature of the Cartesian and parametric curves.
12. Tracing of standard Cartesian and polar curves.

SEMESTER – II

MATDSCT2.1: Mathematics - II	
Teaching Hours : 4 Hours/Week	Credits: 4
Total Teaching Hours: 60 Hours	Max. Marks: 100 (S. A. – 80 + I. A. – 20)

Course Learning Outcomes: This course will enable the students to

- Recall the properties of groups and subgroups.
- Explain the geometrical aspects of partial derivatives and learn the partial differentiation of implicit and explicit functions of several variables.
- Compare the different methods to solve higher order ordinary differential equations and relate their solutions to real world problems.
- Understand and evaluate line integrals and multiple integrals and their geometric properties.
- Learn various commands in Maxima to obtain partial differentiation and evaluate line and multiple integrals.
- Solve different problems using conditional and logical commands in Maxima.

Unit-I: Relations, functions and mathematical logic **15 Hours**

Cartesian product of sets, relations – types of relations, equivalence relations, equivalence classes, partition of a set. Functions – injective, surjective and bijective functions.

Mathematical logic – proposition, basic connectives and truth tables, tautology, contradiction, logical equivalence – laws of logic, converse, inverse and contraposition of a proposition, logical implication – rules of inference.

Unit-II: Groups **15 Hours**

Binary operation, semigroups, definition of a group with examples and properties, congruence problems, subgroups, center of groups, order of an element of a group and its related theorems. cyclic groups, coset decomposition, factor groups, Lagrange's theorem and its consequences.

Unit-III: Partial Derivatives **15 Hours**

Functions of two or more variables - explicit and implicit functions, partial derivatives, basic properties, geometrical meaning of partial derivatives, partial differentiation of homogeneous functions, Euler's theorem, total derivative and chain rule for partial

differentiation of implicit and composite functions, Jacobians - standard properties, maxima and minima of functions of two variables, method of Lagrange's multipliers.

Unit-IV: Higher Order Ordinary differential equations **15 Hours**

Second and higher order linear differential equations with constant coefficients, complementary functions, Particular Integrals when the RHS is of the form e^{ax}, $sin(ax+b)$, $cos(ax+b)$, x^n, $e^{ax}V$ and xV where V is a function of x. Solutions to second order ordinary differential equations with variable coefficients - Cauchy – Euler differential equations, Legendre differential equations, Method of variation of parameters, when a part of complementary function is given, change of independent variables.

Reference Books:

1. Discrete and Combinatorial Mathematics – Ralph P. Grimaldi, Pearson Education.
2. Topics in Algebra, I.N Herstein, Wiley Eastern Ltd., New Delhi.
3. Higher algebra - Bernard & Child, Arihant, ISBN: 9350943199/9789350943199.
4. Modern Algebra - Sharma and Vasista, Krishna Prakashan Mandir, Meerut, U.P.
5. Differential Calculus - Shanti Narayan, S. Chand & Company, New Delhi.
6. Applications of Calculus - Debasish Sengupta, Books and Allied (P) Ltd., 2019.
7. Calculus – Lipman Bers, Holt, Rinehart & Winston.
8. Schaum's Outline of Calculus - Frank Ayres and Elliott Mendelson, 5th ed. USA:Mc. Graw Hill.
9. Ordinary and Partial Differential Equations - M D Raisinghania, S. Chand, Delhi, 2020.
10. Schaum's Outline of Differential Equations – R Bronson and G Costa, 4th Edition, 2014.

MATDSCP2.1: Theory based Lab on Mathematics – II using Maxima	
Teaching Hours : 4 Hours/Week	Credits: 2
Total Teaching Hours: 60 Hours	Max. Marks: 50 (S.A. – 40 + I.A. – 10)

Practical/Lab Work to be performed in Computer Lab:

1. Verification of a relation to be an equivalence relation.
2. Finding equivalence classes w. r. t. a relation on a set.
3. Verification of a function to be a bijection.
4. Verification of binary operations.
5. Constructing Cayley's table and testing the abelian property of an algebraic structure.
6. Verifying whether an algebraic structure is a group.
7. Finding first and second order partial derivatives of functions of two/three variables.
8. Verification of Euler's theorem and its extension for homogeneous functions.
9. Finding Jacobian of functions of two and three variables and verifying its properties.
10. Finding the Complementary Function of second and third order linear differential equations with constant coefficients.
11. Finding the general solution of second and third order linear differential equations with constant coefficients.
12. Solving Cauchy-Euler differential equations of second order.

SEMESTER – III

MATDSCT3.1: Mathematics – III	
Teaching Hours : 4 Hours/Week	Credits: 4
Total Teaching Hours: 60 Hours	Max. Marks: 100 (S. A. – 80 + I. A. – 20)

Course Learning Outcomes: This course will enable the students to

- Demonstrate a comprehensive understanding of fundamental concepts in real analysis, group theory, differential calculus and integral calculus, including their definitions, properties, and theorems.
- Apply mathematical techniques and theorems to solve complex problems across various topics, including the evaluation of integrals, analysis of real analysis, and the application of group properties.
- Analyze mathematical structures and relationships, enabling the identification of patterns, limit behaviors, and the validity of mathematical arguments, particularly in the context of sequences and group homomorphisms.
- Create and formulate new mathematical problems and solutions, integrating knowledge from different areas of mathematics to address real-world applications and theoretical challenges effectively.

Unit-I: Groups - II **15 Hours**

Normal Subgroups – properties, examples and problems, Quotient group, Homomorphism and Isomorphism of groups – properties, examples and problems, Kernel and image of a homomorphism, Normality of the kernel, Fundamental theorem of homomorphism, Properties related to isomorphism, Permutation groups – Cayley's theorem.

Unit-II: Differential Calculus **15 Hours**

Recapitulation of limits, Continuity and differentiability, Properties of continuous functions, Intermediate value theorem, Rolle's Theorem, Lagrange's Mean Value theorem, Cauchy's Mean value theorem, Taylor's theorem, series and Maclaurin's series of one variable, Indeterminate forms and evaluation of limits using L'Hospital rule $\left(\frac{0}{0}, \frac{\infty}{\infty}, \infty - \infty, 0 \times \infty, 0^0, 1^\infty, \infty^0\right)$.

Unit-III: Real Analysis **15 Hours**

Recapitulation of number system. Countable and uncountable sets - standard theorems, Real line, Bounded sets, Supremum and Infimum of a set, Completeness

properties of R, Archimedean property of R. Intervals, Neighborhood of a point, Open sets and Closed sets, Limit point of a set.

Unit-IV: Integral Calculus **15 Hours**

Reduction formulae to evaluate $\int \sin^n x\,dx$, $\int \cos^n x\,dx$ and $\int sin^m x\ cos^n x\,dx$. Definition of a double integral and its conversion to an iterated integral, Evaluation by changing the order of integration and change of variables, Computing area and volume using a double integral. Definition of a triple integral, Evaluation by change of variables, Computing volume using a triple integral. Differentiation under the integral sign by Leibnitz rule (with constant limits).

Reference Books:

1. Topics in Algebra - I.N Herstein, Wiley Eastern Ltd., New Delhi.
2. Higher algebra - Bernard & Child, Arihant, ISBN: 9350943199/9789350943199.
3. Modern Algebra - Sharma and Vasista, Krishna Prakashan Mandir, Meerut, U.P.
4. Differential Calculus - Shanti Narayan, S. Chand & Company, New Delhi.
5. Applications of Calculus - Debasish Sengupta, Books and Allied (P) Ltd., 2019.
6. Calculus – Lipman Bers, Holt, Rinehart & Winston.
7. Calculus - S Narayanan & T. K. Manicavachogam Pillay, S. Viswanathan Pvt. Ltd.,Vol. I & II.
8. Schaum's Outline of Calculus - Frank Ayres and Elliott Mendelson, 5th ed. USA:Mc. Graw Hill.
9. Higher Engineering Mathematics- B. V. Ramana, McGraw Hill Education.

MATDSCP3.1: Theory based Lab on Mathematics – III using Maxima	
Teaching Hours : 4 Hours/Week	Credits: 2
Total Teaching Hours: 60 Hours	Max. Marks: 50 (S.A. – 40 + I.A. – 10)

Practical/Lab Work to be performed in Computer Lab:

1. Verification of normality of a subgroup of a group.
2. Verification of Rolle's theorem.
3. Verification of Lagrange's theorem.
4. Taylor's and Maclaurin's series expansion of a function of a single variable.
5. Evaluation of limits using L'Hospital's rule.
6. Evaluation of an integral using reduction formula.
7. Evaluation of a double integral with constant limits.
8. Evaluation of a double integral over a region in the $xy-$ plane.
9. Evaluation of a double integral using change of variables.
10. Evaluation of a triple integral with constant limits.
11. Evaluation of a triple integral over a domain in the $3D$ space.
12. Finding area and volume using double and triple integrals.

MATDSE3.1: Applied Mathematics	
Teaching Hours : 3 Hours/Week	Credits: 3
Total Teaching Hours: 45 Hours	Max. Marks: 100 (S.A. – 80 + I.A. – 20)

Course Learning Outcomes: This course will enable the students to

- Develop a comprehensive understanding of improper integrals, Gamma and Beta functions, and their applications in evaluating integrals, as well as the principles and properties of Laplace and Fourier transforms.
- Gain the ability to analyze periodic functions using Fourier series, including the computation of Fourier coefficients, and the application of Dirichlet's conditions for convergence, as well as the formulation of half-range series.
- Enhance problem-solving skills by applying Laplace transforms to solve ordinary differential equations and initial value problems, and by utilizing Fourier transforms for signal analysis and processing.
- Integrate theoretical concepts with practical applications by exploring the relationships between different types of transforms, their properties, and their use in various fields such as engineering, physics, and applied mathematics.

Unit-I: Improper Integrals and Fourier Series **15 Hours**

Definition of Gamma and Beta functions, Basic properties, Relation between Beta and Gamma functions, Duplication formula, Evaluation of integrals using Beta and Gamma functions.

Periodic functions, Fourier co-efficient, Dirichlet's conditions for convergence of Fourier series, Fourier series of functions with period 2π and $2l$, Fourier series of even and odd functions, Half range cosine and sine series.

Unit-II: Laplace Transforms **15 Hours**

Definition of Laplace transforms, Basic properties, Laplace transform of some standard functions, Laplace transform of periodic functions, Laplace transform of derivative and integral of a function, Laplace transforms of unit step/Heaviside function and Dirac-Delta function, properties, Convolution theorem. Inverse Laplace transforms and their properties, Solution to IVPs using Laplace transforms.

Unit-III: Fourier Transforms **15 Hours**

The Fourier integral, Complex Fourier transform, Fourier Sine and Cosine transforms, Inverse transforms, Basic properties, Finite Fourier transforms, Transforms of the derivatives, Parseval's identity for Fourier transforms.

Books Recommended

1. Higher Engineering Mathematics- B. S. Grewal, Khanna Publishers, New Delhi.
2. Higher Engineering Mathematics- B. V. Ramana, McGraw Hill Education.
3. Laplace transforms, R. Murray and L. Spiegel, Schaum's Outlines.
4. Laplace Transforms, Goel and Gupta.
5. Integral Transforms Methods in Science & Engineering, Sudhir Kumar, CBS Engineering Series, 2017.
6. Fourier Transforms, Murray R. Spiegel, Schaum's Outlines.

SEMESTER – IV

Course Learning Outcomes: This course will enable the students to

- Develop a solid understanding of key concepts in vector analysis, infinite sequences, infinite series, and partial differential equations, including their definitions, properties, and theorems.
- Enhance analytical skills by applying mathematical principles to solve complex problems, including the evaluation of limits, convergence of sequences and series, and the formulation and solution of partial differential equations.
- Gain the ability to interpret and visualize mathematical concepts geometrically, particularly in vector analysis, including gradients, divergences, and curls, as well as understanding the implications of theorems like Green's and Gauss' theorems.
- Acquire proficiency in using various mathematical techniques and tests for convergence, integration, and solving partial differential equations, enabling the application of these methods to real-world problems and theoretical challenges.

MATDSCT4.1: Mathematics – IV	
Teaching Hours : 4 Hours/Week	Credits: 4
Total Teaching Hours: 60 Hours	Max. Marks: 100 (S. A. – 80 + I. A. – 20)

Unit-I: Vector Analysis 15 Hours

Vector function of a scalar variable. Scalar field - Gradient of a scalar field, geometrical meaning, directional derivative, unit normal using surfaces - tangent plane and normal to the surface. Vector field - divergence and curl of a vector field, geometrical meaning, solenoidal and irrotational fields, Laplacian of a scalar field.

Vector Integration – Definition and basic properties, vector line integral, surface integral and volume integral, Green's theorem in the plane – Proof and related problems, Direct consequences of the theorem, Gauss' divergence theorem – Related problems, Direct consequences of the theorem.

Unit-II: Infinite Sequences of real numbers 15 Hours

Sequences of real numbers, Bounded sequences, Limit of a sequence, Convergent, divergent, and oscillatory sequences, Monotonic sequences, Algebra of convergent sequences, Limit points of a sequence, Bolzano Weierstrass theorem for a sequence,

Limit superior and limit inferior of sequences, Cauchy's first and second theorem on limits of a sequence.

Unit-III: Infinite Series of real numbers **15 Hours**

Series of real numbers, Convergent, Divergent and oscillatory series, Series of non-negative terms, Cauchy's general principle of convergence, Geometric series, p-series (Harmonic series), Comparison tests for positive term series, D'Alembert's ratio test, Raabe's test, Cauchy's Root test and Cauchy's integral test, Alternating series. Leibnitz's theorem. Absolute convergence and conditional convergence of a series.

Unit-IV: Partial Differential Equations **15 Hours**

Formation of a partial differential equation by elimination of arbitrary constants and functions, Solutions of partial differential equation- Lagrange's linear equation of the form $Pp + Qq = R$, Standard types of first order non-linear partial differential equations, Integral of a non-linear pde by Charpit's method, Linear partial differential equations with constant co-efficients – Solution by finding the Complementary Function (CF) and Particular Integral (PI).

Reference Books:

1. Introduction to Real Analysis - R. G. Bartle and D. R. Sherbert, 3rd Ed., John Wiley and Sons (Asia) Pvt. Ltd., Singapore, 2015.
2. Elementary Analysis: The Theory of Calculus - K. A. Ross, 2nd edition, Springer, 2013.
3. A First Course in Real Analysis - S. K. Berberian, Springer Verlag, New York, 1994.
4. Mathematical Analysis - T. Apostol, Narosa Publishing House.
5. Real Analysis - N. P. Bali, New Age International Publishers, 2023.
6. Real Analysis - M. L. Khanna and L. S. Varhiney, Jai Prakash Nath & Co. Meerut.
7. Higher Engineering Mathematics - B. V. Ramana, McGraw Hill Education.
8. Ordinary Differential Equations & Partial Differential Equations - M. D. Raisinghania, S. Chand & Company, New Delhi.
9. Elements of Partial Differential Equations – I. N. Sneddon, Dover Publications, 2006.

MATDSCP4.1: Theory based Lab on Mathematics – IV using Maxima	
Teaching Hours : 4 Hours/Week	Credits: 2
Total Teaching Hours: 60 Hours	Max. Marks: 50 (S.A. – 40 + I.A. – 10)

Practical/Lab Work to be performed in Computer Lab:

1. Finding the gradient of a scalar field and directional derivative.
2. Finding the divergence & curl of a vector field and and Laplacian of a scalar field.
3. Demonstrating the physical/geometrical interpretation of gradient, divergence and curl operators.
4. Evaluating a vector line integral over a plane curve.
5. Evaluating a volume integral of a vector field.
6. Program to verify Green's theorem in the plane.
7. Verification of Gauss' divergence theorem.
8. Determining the nature of an infinite sequence using limits.
9. Testing the nature of an infinite series of positive terms using nth partial sum.
10. Testing the nature of an infinite series using D'Alembert's ratio test.
11. Finding the solution to a homogeneous linear pde with constant coefficients.
12. Finding the solution to a linear pde with constant coefficients by finding the CF and PI.

MATDSE 4.1: Number Theory	
Teaching Hours : 3 Hours/Week	Credits: 3
Total Teaching Hours: 45 Hours	Max. Marks: 100 (S.A. – 80 + I.A. – 20)

Course Learning Outcomes: This course will enable the students to

- Recall the fundamental aspects of different types of numbers.
- Describe division algorithm to find the quotient and remainder during the division of an integer by another integer.
- Learn the concepts of congruences and their properties.
- Use Euclidean algorithm to find the GCD of two numbers and apply it to solve linear Diophantine equations and linear congruences.
- Describe the various properties of prime numbers.
- Examine the properties of different number theoretic functions.

Unit-I: Properties of divisibility and primes **15 Hours**

The Division Algorithm, Properties of Divisibility, Greatest Common Divisor, The Euclidean Algorithm, Least Common Multiple, Linear Diophantine Equation, Prime numbers and their properties, The Fundamental Theorem of Arithmetic.

Unit-II: Congruences and Chinese Remainder Theorem **15 Hours**

Basic Properties of Congruences and applications, Binary and Decimal Representations of Integers, Linear Congruences and their solutions, Chinese Remainder Theorem and applications, Fermat's Little Theorem and Pseudo primes, Wilson's Theorem, Fermat's numbers.

Unit-III: Number Theoritic Functions **15 Hours**

Multiplicative Functions, The Sum and Number of Divisors, The Möbius Inversion Formula, The Greatest Integer Function, Euler's Phi-Function, Euler's Generalization of Fermat's Theorem, Properties of Phi-Function.

Reference Books:

1. Elementary Number Theory - David M. Burton, 7th Ed., McGraw-Hill Edition, Indian reprint, 2023.
2. An Introduction to The Theory of Numbers - I. Niven, H.S. Zuckerman and H.L. Montgomery, Fifth Edition, New Delhi: John Wiley & Sons, Inc., 2012.
3. A Classical Introduction to Modern Number Theory - K. Ireland and M. Rosen, Second Edition, New York: Springer-Verlag, 2010.
4. Elementary Number Theory - G. A. Jones And J. Mary Jones, Springer, 1998.
5. A Friendly Introduction To Number Theory - J. H. Silverman, 4thEdition, Pearson Prentice Hall, 2019.

Blueprint for DSCT

Question Paper Pattern for DSCT (I, II, III and IV semester)
(S.A. - 80 + I.A. - 20)

Duration: 03 hours **Max. Marks: 80**

PART- A	
Answer any 10 questions of the given 12 questions	10 X 2 = 20
Question Numbers – 1 to 12	
PART- B	
Answer any 6 questions of the given 8 questions	6 X 5 = 30
Question Numbers –13 to 20	
PART – C	
Answer any 6 questions of the given 8 questions	6 X 5 = 30
Question Numbers –21 to 28	

Unit	Unit 1	Unit 2	Unit 3	Unit 4
PART- A	03 Questions	03 Questions	03 Questions	03 Questions
PART- B	04 Questions	04 Questions	-	-
PART- C	-	-	04 Questions	04 Questions

Blueprint for DSCE

Question Paper Pattern for DSCE (III and IV semester)
(S.A. - 80 + I.A. - 20)

Duration: 03 hours **Max. Marks: 80**

PART- A	
Answer any 10 questions of the given 12 questions	10 X 2 = 20
Question Numbers – 1 to 12	
PART- B	
Answer any 10 questions of the given 12 questions	10 X 3 = 30
Question Numbers –13 to 24	
PART – C	
Answer any 5 questions of the given 6 questions	5 X 6 = 30
Question Numbers –25 to 30	

Note: The question paper shall strictly adhere to the following blueprint.

Unit	Unit 1	Unit 2	Unit 3
PART- A	04 Questions	04 Questions	04 Questions
PART- B	04 Questions	04 Questions	04 Questions
PART- C	02 Questions	02 Questions	02 Questions

Practical Examination Pattern for DSCP (I, II, III and IV semester)
(S.A. - 40 + I.A. - 10)

Duration: 03 hours **Max. Marks: 40**

Marks Allotment	
Program writing*	10
Problem solving*	10
Program execution*	10
Viva-voce**	05
Record	05
Total	**40 marks**

Note:

*(i) A total of 3 programs should be given to each student. He/she has to write any two out of the three programs, solve the corresponding problems, write the programs and then execute them using Maxima.

**(ii) Viva-voce examination should be conducted based on the syllabus for the corresponding semester.