Kanya Maha Vidyalaya, Jalandhar (Autonomous)

Scheme and Curriculum of Examinations of Four Year Undergraduate Degree Programme

(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)

Bachelor of Arts/ Bachelor of Science (Honours)

Semester-I

Session: 2024-25

Bachelor of Arts/ Bachelor of Science (Honours) Semester-I											
Programme Name	Course Code	Course Title	Course Type	Hours per week L-T-P	Credits L-T-P	Total Credits	Marks Total	Ext. Th	Ext. P	CA	Examination time (in Hours)
Bachelor of Arts/ Bachelor of Science (Honours)	BARL-1333 BECL-1333 BSNL-1333 BCSL-1333	Mathematics (Algebra)	DSC	4-0-0	4-0-0	4	100	70	-	30	3
Bachelor of Arts/ Bachelor of Science (Honours)	BARP-1333 BECP-1333 BSNP-1333 BCSP-1333	Mathematics (Algebra Laboratory)		0-0-2	0-0-1	1	50	-	35	15	3

				2						

DSC-Discipline Specific Course

Bachelor of Arts/ Bachelor of Science (Honours)
Semester–I
Session: 2024-25
Course Title: Mathematics (Algebra)

Course Code: BARL/ BECL/ BCSL/ BSNL-1333

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of matrix congruence of skew symmetric matrices and its reduction in real field. Solve system of linear equations.

CO 2: Obtain Eigen values, Eigen vectors, minimal and characteristic equation of a matrix and to apply it in advanced dynamics and electric current.

CO 3: Classify real quadratic form in variables, definite, semi- definite and indefinite real quadratic form.

CO 4: To find the relations between the roots and coefficients of general polynomial equation in one variable, distinguish between solution of cubic equations and Bi-quadratic equations.

Bachelor of Arts/ Bachelor of Science (Honours)
Semester–I
Session: 2024-25
Course Title: Mathematics (Algebra)
Course Code: BARL/ BECL/ BCSL/ BSNL-1333

Examination Time: 3 Hours   Max. Marks: 100
  L T P   Theory: 70
  4 0 0   CA: 30

Instructions for the Paper Setter: Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Partitioning of Matrices, Matrices Partitioned conformably for Multiplication, Rank of a Matrix, Normal form, Row rank, Column rank of a matrix, Equivalence of column and row ranks, rank of product of matrices, Linear independence of row and column vectors Applications of matrices to a system of linear (both homogeneous and non–homogeneous) equations. Theorems on consistency of a system of linear equations.

Unit-II

Eigenvalues, Eigenvectors, Hermitian Matrix, Skew Hermitian matrix and unitary matrix and properties of Eigen value, minimal and the characteristic equation of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix.

Unit-III

Quadratic Forms, quadratic form as a product of matrices. The set of quadratic forms over a field. Congruence of quadratic forms and matrices. Congruent transformations of matrices. Elementary congruent transformations. Congruent reduction of a symmetric matrix. Reduction in the real field. Classification of real quadratic forms in n variables. Definite, semi–definite and indefinite real quadratic forms. Characteristic properties of definite, semi–definite and indefinite forms.

Unit-IV

Relations between the roots and coefficients of general polynomial equation of degree n in one variable. Vieta 's Formula, Fundamental Theorem of Algebra (Statement only) Transformation of equations, Equations of Squared differences, Solution of cubic equations by Cardan method, Discriminant of polynomial equation, Discriminant of Cubic equation, nature of roots of cubic, Solution of Biquadratic by Ferrari's Method with illustrations, Descartes's Rules of Signs with illustrations.

Text Books:-

1. Shanti Narayan and P.K. Mittal: Text Book of Matrices.
2. K.B. Datta : Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi, 2000.

Reference Book:-

1. Tom M. Apostol: Calculus: An Indian Adaptation, Wiley India, 2023

Bachelor of Arts/ Bachelor of Science (Honours)
Semester–I
Session: 2024-25
Course Title: Mathematics (Algebra Laboratory)

Course Code: BARP/ BECP/ BCSP/ BSNP-1333

Examination Time: 3 Hours   Max. Marks: 50
                                                                        Practical: 35
L T P   CA: 15
0 0 1

List of Practicals (using any package)
   1. Introduction to the computer package in the practicals.
   2. Matrix operations: addition, multiplication, inverse. transpose, determinant of matrix.
   3. Find Rank of matrix: Row Rank, Column Rank.
   4. Find row reduced echelon form
   5. Create the coefficient matrix A and vector b. Solve for x using the inverse, using the built-in function.
   6. Solving a linear system, using Gauss elimination numerically.
   7. Finding eigenvalues and eigenvectors, numerically.

Reference Books:-
   1. S.S. Sastry, Engineering Mathematics - Volume I (4th Edition), PHI, 2008.
   2. S.S. Sastry, Engineering Mathematics - Volume II (4th Edition), PHI, 2008.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

Scheme and Curriculum of Examinations of Four Year Undergraduate Degree Programme

(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)

Bachelor of Arts/ Bachelor of Science (Honours)
Semester-II

Session: 2024-25

Bachelor of Arts/ Bachelor of Science (Honours) Semester-II											
Programme Name	Course Code	Course Title	Course Type	Hours per week L-T-P	Credits L-T-P	Total Credits	Marks Total	Ext. Th	P	CA	Examination time (in Hours)
Bachelor of Arts/ Bachelor of Science (Honours)	BARL-2333 BECL-2333 BSNL-2333 BCSL-2333	Mathematics (Calculus)	DSC	4-0-0	4-0-0	4	100	70	-	30	3
Bachelor of Arts/ Bachelor of Science (Honours)	BARP-2333 BECP-2333 BSNP-2333 BCSP-	Mathematics (Calculus Laboratory)		0-0-2	0-0-1	1	50	-	35	15	3

Program	Course Code	Course Title	Category								
	2333										
Bachelor of Arts/ Bachelor of Science (Honours)	BARL-2330 BECL-2330 BSNL-2330 BCSL-2330	Statistical Analysis Using Excel	SEC	1-0-0	1-0-0	1	50	35	-	15	3
Bachelor of Arts/ Bachelor of Science (Honours)	BARP-2330 BECP-2330 BSNP-2330 BCSP-2330	Statistical Analysis Using Excel Laboratory	SEC	0-0-4	0-0-2	2	50	-	35	15	3

DSC-Discipline Specific Course

SEC-Skill Enhancement Course

Bachelor of Arts/ Bachelor of Science (Honours)
Semester–II

Session: 2024-25

Course Title: Mathematics (Calculus)

Course Code: BARL/BECL/ BCSL/BSNL-2333

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand real number system, limit of a function, basic properties of limit, continuity, and classification of discontinuities & to apply it in real world problem.

CO 2: To Classify the difference between Hyperbolic and Inverse Hyperbolic functions and understand the concept of Taylor's and Maclaurin theorem with its applications.

CO 3: Demonstrate Asymptotes and De Moivre's theorem (for integer and Rational index) and its applications, primitive nth roots of unity.

CO 4: To understand the concepts of definite integrals and their properties and Reduction Formulae & to apply in a wide variety of disciplines like Bio, Eco, Physics & Engineering.

Bachelor of Arts/ Bachelor of Science (Honours)
Semester–II

Session: 2024-25

Course Title: Mathematics (Calculus)

Course Code: BARL/BECL/ BCSL/BSNL-2333

Examination Time: 3 Hours   Max. Marks: 100
L T P   Theory: 70
4 00   CA: 30

Instructions for the Paper Setter: Eight questions of equal marks (14 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Real number system and its order properties: lub, glb of sets of real numbers, Completeness property, Archimedean property, Dense property of Rational numbers, Limit of a function of real variable, Properties of Limits, Squeeze Theorem, Continuous function and classification of discontinuities, Differentiability of a function of real variable, Concavity and Convexity of function, Point of inflexion.

Unit-II

Derivatives of Hyperbolic and Inverse Hyperbolic functions, nth order derivatives, Leibnitz theorem on nth derivative and its applications, Taylor's and Maclaurin theorem with Lagrange form of remainder, Application of Taylor's theorem in error estimation; Taylor's series expansions of $Sinx, Cosx, e^{cosx}. logx$ etc. Indeterminate forms and L'Hopital rule.

Unit-III

Asymptotes, Horizontal Asymptotes, Vertical Asymptotes, Oblique Asymptotes, Asymptotes of general Rational Algebraic Curve with illustrations, Intersection of curve and its Asymptotes, de Moivre's theorem (for integer and Rational index) and its applications, primitive nth roots of unity.

Unit-IV

Integration of hyperbolic functions, Properties of definite integral, Reduction formulae of type

$\tan^n x\, dx, \int \cot^n x\, dx, \int \sec^n x\, dx, \int \csc^n x\, dx, \int x\cos^n x\, dx, \int \cos^m x\, \sin nx\, dx$,
Reduction formulae of using rule of smaller index +1 of type
$\int_0^{\frac{\pi}{2}} \sin^n x\, \cos^n x\, dx, \int_0^{\frac{\pi}{2}} \cos^n x\, dx, \int_0^{\frac{\pi}{2}} \sin^n x\, dx$

Text Books:-

1. S. Narayan and P.K.Mittal: Integral Calculus.Sultan Chand & Sons.
2. Gorakh Prasad, Differential Calculus (19th ed.). Pothishala Pvt. Ltd. Allahabad,2016.

Reference Books:-

1. Tom M.A postol, Calculus: An Indian Adaptation, Wiley India,2023.
2. MurrayR.Spiegel, Theory and Problems of Advanced Calculus, Schaum' soutlineseries, Schaum Publishing Co.NewYork.

Bachelor of Arts/ Bachelor of Science (Honours)
Semester–II

Session: 2024-25

Course Title: Mathematics (Calculus Laboratory)

Course Code: BARP/ BECP/ BCSP/ BSNP-2333

Examination Time: 3 Hours   Max. Marks: 50

                                                          Practical: 35
L T P   CA: 15
0 0 1

List of Practicals (using any package)

1. Plotting graphs of elementary functions eax+b sin(bx+c) , log(ax+b),
   1/(ax+b), sin(ax+b),cos(ax+b), |ax+b| and to illustrate the effect of a
   and b on the graphs.
2. Plotting the graphs of the polynomial of degree 4 and 5, the
   derivative graph, the second derivative graph
3. Tracing of conics in Cartesian coordinates and using the general
   equation of second degreein x and y.
4. Tracing of conicoids: Ellipsoid, Hyperbolic paraboloid, Elliptic
   paraboloid, Hyperboloid ofone and two sheets etc.
5. Graphs of hyperbolic functions.
6. Approximation of limit.
7. Approximations of derivatives.

Reference Books:-

1. S.S. Sastry, Engineering Mathematics -Volume I (4th Edition), PHI, 2008.
2. S.S. Sastry, Engineering Mathematics -Volume II (4th Edition), PHI, 2008.

Bachelor of Arts/ Bachelor of Science (Honours)
Semester–II

Session: 2024-25

Course Title: Statistical Analysis using Excel
Course Code: BARL/ BECL/ BCSL/ BSNL-2330

After passing this course, the students will be able to:

CO:1 Introduce the meaning of statistics, Collection, presentation and interpretation of data with the help of excel.

 CO:2 To Enhance the knowledge of Measures of dispersion, Skewness and Bowley's co-efficient of skewness and Kurtosis.

 CO:3 To comprehend the concept of Correlation and its methods with rank correlation coefficient.

  CO:4 To understand the concept of Linear Regression, regression Yon X, regression X on Y, Regression Coefficient, Difference between regression and Correlation, and calculation of these using MS excel.

Bachelor of Arts/ Bachelor of Science (Honours)
Semester–II

Session: 2024-25

Course Title: Statistical Analysis using Excel

Course Code: BARL/ BECL/ BCSL/ BSNL-2330

Examination Time: 3 Hours   Max. Marks: 50

                                                                  Theory: 35
L T P   CA: 15
1 0 0
Instructions for Paper Setters:

Eight questions of equal marks (7 marks each) are to be set, two in each of the four
Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the
syllabus respectively. Questions may be subdivided into parts (not exceeding four).
Candidates are required to attempt five questions.

Unit-I

Introduction to statistics, functions of statistics, collection of data, presentation of
data, tabulation of data, charting of data, introduction to excel/spss, graphs in
excel, measures of central tendency-, mean, median - meaning and computation,
mode- meaning and computation, weighted average mean, geometric mean and
harmonic mean.

Unit-II

Measures of dispersion, types of dispersion- range, quartile deviation, mean
deviation, standard deviation, co-efficient of variation. Skewness- Karl Pearson
co-efficient of skewness, Bowley's co-efficient of skewness and Kurtosis.

Unit-III

Correlation, Types of correlation, positive, negative, linear. methods of
correlations – Karl Pearson's Co-efficient of correlation, rank correlation
coefficient.

Unit-IV

Regression analysis- Linear Regression, regression Yon X, regression X on Y,
Regression Coefficient, Relations between regression coefficients and correlation
coefficients, Difference between regression and Correlation, Calculation of these
using MS excel.

Reference Books:-

1. SC Gupta, Fundamentals of Mathematical Statistics, Himalaya Publication.
2. Data Analysis with Microsoft Excel by K. Berk, Partrick Carey.

Bachelor of Arts/ Bachelor of Science /Honours
Semester–II

Session: 2024-25

Course Title: Statistical Analysis Using Excel Laboratory

Course Code: BARP/ BECP/ BCSP/ BSNP-2330

Examination Time: 3 Hours   Max. Marks: 50

Practical: 35

L T P   C A: 15
0 0 2

List of Practicals (using excel)

1. Introduction of basics of excel and functions such as 'sum', 'count', 'countif', 'max', 'min','sort' etc.
2. To prepare result from the data on marks and number of credits in a given number of courses of a class based on total marks, marks obtained, percentage of marks obtained, grades, and determine SGPA for each student.
3. Create frequency distribution table; plot histogram, bar chart, pie chart, etc.
4. Plotting two dimensional graphs.
5. To find measures of central tendency for a given data.
6. To find measures of dispersion for a given data.
7. To find measures of skewness and kurtosis for a given data.
8. To find Karl Pearson Coefficient of correlation and rank correlation coefficient for a givendata.
9. To find regression coefficient for bivariate data and plotting regression lines.

Reference Books:-

1. S. C. Gupta, Fundamentals of Mathematical Statistics, Himalaya Publication.
2. K. Berk, Partrick Carey, Data Analysis with Microsoft Excel.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Scheme and Curriculum of Examinations of Three Year Degree Programme
(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)
Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester-III
Session: 2024-25

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester-III											
Programme Name	Course Code	Course Title	Course Type	Hours per week L-T-P	Credits L-T-P	Total Credits	Marks				Examination time (in Hours)
							Total	Ext.		CA	
								Th	P		
Bachelor of Arts Bachelor of Science (Economics) Bachelor of Science (Non-Medical) Bachelor of Science (Computer Science)	BARM-3333 BECM-3333 BSNM-3333 BCSM-3333	(I) Mathematics (Analysis)	E/C	4-0-0	4-0-0	4	100	80	-	20	3
Bachelor of Arts Bachelor of Science (Economics) Bachelor	BARM-3333 BECM-3333 BSNM-	(II) Mathematics (Analytical Geometry)		3-0-0	3-0-0	3	75	60	-	15	3

15

of Science(Non-Medical) Bachelor of Science (Computer Science	3333 BCSM -3333												

C-Compulsory
E-Elective

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester-III
Session: 2024-25
Course Title: Mathematics (Analysis)
Course Code: BARM/ BECM/ BCSM/ BSNM-3333(I)
Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate an understanding of limits and how they are used in sequences.

CO 2: Understanding how limits are used in series and apply various test on series.

CO 3: To understand the concepts of Riemann sum, partitions, upper and lower sums, Riemann Integrability of continuous functions and of monotone functions. Distinguish between the absolute convergence and conditional convergence.

CO 4: To know and describe the converging behaviour of improper integrals and Beta , Gamma functions. To find the relation between Beta and Gamma functions.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–III
Session: 2024-25
Course Title: Mathematics (Analysis)
Course Code: BARM/ BECM/ BCSM/ BSNM-3333(I)

Examination Time: 3 Hrs   Max. Marks: 100
L T P

4 0 0   Theory: 80

CA: 20

Instructions for the Paper Setter: Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Definition of a sequence. Theorems on limits of sequences. Bounded and monotonic sequences. Cauchy's convergence criterion.

Unit-II

Series of non-negative terms. Comparison tests. Cauchy's integral tests. Ratio tests. Cauchy's root test. Raabe's test, logarithmic test. Demorgan's and Bertrand's tests. Kummer's test, Cauchy Condensation test, Gauss test, Alternating series. Leibnitz's test, absolute and conditional convergence

Unit-III

Partitions, Upper and lower sums. Upper and lower integrals, Riemann integrability. Conditions of existence of Riemann integrability of continuous functions and of monotone functions. Algebra of integrable functions.

Unit-IV

Improper integrals and statements of their conditions of existence. Test of the convergence of improper integral, beta and gamma functions.

Text Book:
   A. Kumar and S. Kumaresan, A Basic Course in Real Analysis, CRC Press, New York, 2014.

Reference Books:
1.S. C Malik and S. Arora, Mathematical Analysis, New Age international Publishers, New Delhi, second edition, 2005.
2.T. M. Apostal, Mathematical Analysis, Pearson education, second edition, 2004.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–III
Session: 2024-25
Course Title: Mathematics (Analytical Geometry)
Course Code: BARM/ BECM/ BCSM/ BSNM-3333(II)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of the geometry of lines, shifting of origin and rotation of axis in the Euclidian plane.

CO 2: Develop geometry with a degree of confidence and will gain fluency in the basics of parabola in Euclidian geometry.

CO 3: Demonstrate the concept of ellipse and hyperbola in general quadratic equation.

CO 4: Understand the concept of geometry and real time characteristics of plain and spheres.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–III
Session: 2024-25
Course Title: Mathematics (Analytical Geometry)
Course Code: BARM/ BECM/ BCSM/ BSNM-3333(II)

Examination Time: 3 Hours   Max. Marks: 75

L-T-P   Theory: 60

3 0 0
CA:15

Instructions for the Paper Setter: Eight questions of equal marks (12 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Transformation of axes, shifting of origin, Rotation of axes in two dimension and three dimensions, the invariants, Joint equation of pair of straight lines, equations of bisectors

Unit-II

Parabola and its properties. Tangents and normal, Pole and polar, pair of tangents at a point, Chord of contact, equation of the chord in terms of mid-point and diameter of conic.

Unit-III

Ellipse and hyperbola with their properties. Tangents and normal, Pole and polar. pair of tangents at a point, Chord of contact, Identifications of curves represented by second degree equation (including pair of lines).

Unit-IV

Intersection of three planes, condition for three planes to intersect in a point or along a line or to form a prism. Sphere: Section of a sphere by a plane, spheres of a given circle. Intersection of a line and a sphere. Tangent line, tangent plane, power of a point with respect to a sphere, radical planes.

Text Book:
S.L. Loney, The Elements of Coordinate Geometry, Arihant Publications, Sixth edition, 2016.

Reference Books:

1.   G. Prasad and H.C. Gupta, Text Book on Coordinate Geometry, Pothishala Private Limited, Allahabad, 2000.
2.   S. Narayan and P.K. Mittal, Analytical Solid Geometry, S. Chand & company, Seventeenth edition, 2007.
3.   E. Kreyszig, Advanced Engineering Mathematics, Wiley Publisher, Tenth edition, 2010.
4.   G.B. Thomos, and R.L. Finney, Calculus and Analytic Geometry, Addison Wesley, Ninth edition, 1995.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Scheme and Curriculum of Examinations of Three Year Degree Programme
(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)
Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester-IV
Session: 2024-25

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester-IV											
Programme Name	Course Code		Course Title	Course Type	Hours per week L-T-P	Credits L-T-P	Total Credits	Marks				Examination time (in Hours)
								Total	Ext.		CA	
									Th	P		
Bachelor of Arts Bachelor of Science (Economics) Bachelor of Science (Non-Medical) Bachelor of Science (Computer Science)	BARM-4333 BECM-4333 BSNM-4333 BCSM-4333	(I)	Mathematics (Statics and Vector Calculus)	E/C	4-0-0	4-0-0	4	100	80	-	20	3
Bachelor of Arts Bachelor of Science (Economics) Bachelor	BARM-4333 BECM-4333 BSNM-	(II)	Mathematics (Solid Geometry)		3-0-0	3-0-0	3	75	60	-	15	3

of Science(Non-Medical) Bachelor of Science (Computer Science	4333 BCSM -4333										

C-Compulsory
E-Elective

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–IV
Session: 2024-25
Course Title: Mathematics (Statics and Vector Calculus)
Course Code: BARM/BECM/ BCSM/BSNM-4333(I)

Course Outcomes

After passing this course, the students will be able:

CO 1: To apply parallelogram law of forces, triangle law of forces, Lami's theorem to real life problems and also understand that how one can resolve number of coplanar forces, parallel forces and concurrent forces acting at a body.

CO 2: To find the applications of CG of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

CO 3: To find the values of gradient, divergence and curl operator of given vectors

CO 4: To find the application of Gauss theorem, Green's theorem and Stokes's theorem in real life problems.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–IV
Session: 2024-25
Course Title: Mathematics (Statics and Vector Calculus)
Course Code: BARM/BECM/ BCSM/BSNM-4333(I)

Examination Time: 3 Hours   Max. Marks: 100

L-T-P   Theory: 80

 4 0 0
CA:20

Instructions for the Paper Setter: Eight questions of equal marks (16 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Composition and resolution of forces (parallelogram law, triangle law, polygon law, Lami's Theorem(λ-μ) theorem). Resultant of a number of coplanar forces, parallel forces. Moments ,Varignon's Theorem of moments, Couples , Resultant of two Coplanar Couples, Equilibrium of two coplanar couples, Resultant of a force and a couple, Equilibrium of coplanar forces.

Unit-II

Friction, Laws of friction, Equilibrium of a particle on a rough plane. Centre of Gravity: Centre of gravity of a rod, triangular lamina, solid hemisphere, hollow hemisphere, solid cone and hollow cone.

Unit-III

Vector differentiation, Gradient, divergence and curl operators, line integrals, Vector identity, and Vector integration.

Unit-IV

Theorems of Gauss, Green, Stokes and problems based on these.

Reference Books:
1. N.P. Bali, Statics, Laxmi Publications, Sixth edition, 2007.
2. M.R. Spiegal, Vector Analysis, Schaum's outline Series, McGraw Hill, Second edition, 2017.
3. S.L. Loney, The Elements of Statics and Dynamics, Arihant Publications, Sixth edition, 2016.
4. R.S. Verma, A Text Book on Statics, Pothishala Private Limited, Allahabad, 1962.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–IV
Session: 2024-25
Course Title: Mathematics (Solid Geometry)
Course Code: BARM/BECM/ BCSM/BSNM-4333(II)

Course Outcomes

After passing this course, the students will be able to:

CO 1: Understand the concept of cylinder, enveloping cylinder and its limiting form.

CO 2: Demonstrate the concept of cone, classification of cone, intersection of line and cone, reciprocal cone.

CO 3: Describe the concept of conicoid or quadratic surface, its classification, trace different types of conicoid and hence find surface of revolution.

CO 4: Describe the concept of tangent and normal plane to the conicoid and Identify the conicoid, representing it in the form of hyperboloid, ellipsoid, paraboloid.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–IV
Session: 2024-25
Course Title: Mathematics (Solid Geometry)
Course Code: BARM/BECM/ BCSM/BSNM-4333(II)

Examination Time: 3 Hours   Max. Marks: 75

L-T-P   Theory: 60

 3 0 0
CA:15

Instructions for the Paper Setter: Eight questions of equal marks (12 marks each) are
to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be
set from Units I-IV of the syllabus respectively. Questions may be subdivided into
parts (not exceeding four). Candidates are required to attempt five questions, selecting
at least one question from each section. The fifth question may be attempted from any
Section.

Unit-I
Cylinder as surface generated by a line moving parallel to a fixed line and through
fixed curve. Different kinds of cylinders such as right circular, elliptic, hyperbolic and
parabolic in standard forms

Unit-II
Cone with a vertex at the origin as the graph of homogeneous equation of second
degree in x, y, z . Cone as a surface generated by a line passing through a fixed curve
and fixed point outside the plane of the curve. Right circular and elliptic cones.

Unit-III
Equation of surface of revolution obtained by rotating the curve $f(x,y)=0$ about the z-
axis in the form of $f(x^2+y^2, z) =0$.Equation of ellipsoid, hyperboloid and Paraboloid in
standard forms.

Unit-IV
Surfaces represented by general equation of 2nd degree $S = 0$. Tangent lines, tangent
planes and Normal Plane.

Text Book:
P. K. Jain & Khalil Ahmed, A text book of Analytical Geometry of three dimensions,
New age international limited, Second edition, 2003.

 Reference Books:
1. S. Narayan, & P.K.Mittal, Analytical Solid Geometry, Sultan Chand & Sons, New
Delhi, Sixteenth edition, 2002 (Scope in Chapters-7,8,11).
2. E. Kreyszig, Advance Engineering Mathematics, John Willey & Sons, tenth
edition, 2011.

Scheme and Curriculum of Examinations of Three Year Degree Programme

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester-V

Session: 2024-25

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester-V								
Programme Name	Course Code	Course Title	Course Type	Marks				Examination time (in Hours)
				Total	Ext.		CA	
					L	P		
Bachelor of Arts Bachelor of Science (Economics) Bachelor of Science (Non-Medical) Bachelor of Science (Computer Science)	BARM-5333 BECM-5333 BSNM-5333 BCSM-5333	(I) Mathematics (Dynamics)	E/C	50	40	-	10	3
Bachelor of Arts Bachelor of Science (Economics) Bachelor of Science (Non-Medical) Bachelor of	BARM-5333 BECM-5333 BSNM-5333 BCSM-5333	(II) Mathematics (Number Theory)		50	40	-	10	3

Science (Computer Science)								

C-Compulsory

E-Elective

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–V
Session: 2024-25
Course Title: Mathematics (Dynamics)
Course Code: BARM /BECM / BCSM/ BSNM-5333(I)
Course Outcomes

After passing this course, the students will be able to:

CO 1: Demonstrate the basic relations between distance, time, velocity and acceleration, manage to solve the problems of Newton's Laws of Motion and the motion of particles connected by a string.

CO 2: Illustrate motion along a smooth inclined plane. Solve different types of problems with Variable Acceleration. Discuss Simple Harmonic Motion.

CO 3: Understand the concept of projectile, oscillating system.

CO 4: Define Work, Power and Energy and explain their relationship. Use measurement tools to apply the concepts of Work and power to solve real life problems. Identify the different types of energy.

Bachelor of Arts /Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–V
Session: 2024-25
Course Title: Mathematics (Dynamics)
Course Code: BARM/ BECM/ BCSM/ BSNM-5333(I)

Examination Time:3 Hours   Max Marks:50
                                                                        Theory:40
                                                                        CA:10

Instructions for the paper setter:

Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

Unit-I

Rectilinear motion in a straight line with uniform acceleration, Newton's laws of motion. Motion of two particles connected by a string.

Unit-II

Motion along a smooth inclined plane. Variable acceleration. Simple Harmonic Motion.

Unit-III

Curvilinear motion of particle in a plane, Definition of velocity and acceleration, projectiles, velocity and direction of motion of a projectile after a given time, projectiles on an inclined plane. Oscillations: Free Vibrations, Simple Pendulum, Conical Pendulum.

Unit-IV

Work, Power and Energy: Kinetic and Potential energy, Conservative forces. Theorem of conservation of energy. Work done against gravity.

Text Book:

R. Kumar, Fundamentals of Dynamics, Pardeep Publications, Jalandhar city, second edition, 2004

Reference Books:

 1.F. Chorlton, Text Book of Dynamics, CBS Publishers, New Delhi, second edition, 2004 (Scope in chapters 3,8).

 2. S.R. Gupta, Elementary Analytical Dynamics, S. Chand and Company, New Delhi, Fourteenth Edition, 1983(Scope in chapters 1,2,3)

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–V
Session: 2024-25
Course Title: Mathematics (Number Theory)
Course Code: BARM/ BECM/ BCSM/ BSNM-5333(II)
Course Outcomes

Successful completion of this course will enable the students to:

CO 1: Prove results involving divisibility and greatest common divisors.

CO 2: Find solutions of specified linear Diophantine equation, basic properties of Congruences.

CO 3: Solve system of linear congruences. Apply Fermat's and Wilson's theorem to solve numerical problems.

CO 4: Apply Euler's theorem and apply properties of phi functions in real world problems. Understand application of important arithmetic functions.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–V
Session: 2024-25
Course Title: Mathematics (Number Theory)
Course Code: BARM/ BECM/ BCSM/ BSNM-5333(II)

Examination Time:3 Hours   Max Marks:50
                                                                                     Theory:40
                                                                                     CA:10

Instructions for the Paper Setter:

Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. The question paper must contain 30% of the article/theory from the syllabus.

Unit-I

The division algorithm, The greatest common divisor, least common multiple, The Euclidean algorithm.

Unit-II

The Diophantine equation $ax + by = c$, Prime numbers and their distribution, the fundamental theorem of arithmetic, Basic properties of congruences.

Unit-III

Linear congruences, Special divisibility tests, Chinese remainder theorem, The Fermat's theorem, Wilson's theorem

Unit-IV

Euler's Phi function, Euler's theorem, some properties of the Phi Function, σ and τ functions, Mobius Inversion formula, Greatest integer function

Text Book:

D. M. Burton, Elementary Number Theory, Mc Graw-Hill, seventh edition, 2010.

Reference Books,

1.Niven and Zuckerman, An Introduction to the theory of Numbers, John Willey & Sons, 1991.

Scheme and Curriculum of Examinations of Three Year Degree Programme

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)

Semester-VI

Session: 2024-25

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester-VI								
Programme Name	Course Code	Course Title	Course Type	Marks				Examination time (in Hours)
				Total	Ext.		CA	
					L	P		
Bachelor of Arts Bachelor of Science (Economics) Bachelor of Science (Non-Medical) Bachelor of Science (Computer Science)	BARM-6333 BECM-6333 BSNM-6333 BCSM-6333	(I) Mathematics (Linear Algebra)	E/C	50	40	-	10	3
Bachelor of Arts Bachelor of Science (Economics) Bachelor of Science (Non-Medical) Bachelor of Science (Computer Science)	BARM-6333 BECM-6333 BSNM-6333 BCSM-6333	(II) Mathematics (Numerical Analysis)		50	40	-	10	3

C-Compulsory

E-Elective

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)
Semester–VI
Session- 2024-25
Course Title: Mathematics (Linear Algebra)
Course Code: BARM/BECM/BCSM/BSNM-6333(I)
Course Outcomes

After the completion of this course, students should be able to:

CO 1: Express the algebraic concepts such as binary operation, groups, rings and fields. Define a vector space and subspace of a vector space and check the linear dependence and linear independence of vectors.

CO 2: Describe the concepts of basis and dimension of vector spaces.

CO 3: Investigate properties of vector spaces and subspaces using linear transformation.

CO 4: Find the matrix representing a linear transformation.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)
Semester–VI
Session: 2024-25
Course Title: Mathematics (Linear Algebra)
Course Code: BARM/BECM/ BCSM/BSNM-6333(I)

Examination Time: 3 Hours   Max. Marks:50
                                                              Theory:40
                                                                  CA:10

Instructions for the paper setters/examiners:

Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

Unit-I

Definition of groups, rings and fields with examples. Definition of a vector space, subspaces with examples. Direct sum of subspaces. Linear span, Linear dependence, Linear independence of vectors. Linear combination of vectors.

Unit-II

Basis of a vector space, Finitely generated vector spaces. Existence theorem for basis. Invariance of the number of elements of the basis set. Dimension of sum of two subspaces. Quotient space and its dimension.

Unit-III

Linear transformation. Algebra of linear transformation. Rank-Nullity theorem, Isomorphism and Isomorphic spaces.

Unit-IV

Matrix of a linear transformation. Changes of basis, Linear operator.

Text Book:

C.W.Curtis, Linear Algebra, Springer, New York, 2017

Reference Books:

1.S. Singh, Linear Algebra, Vikas Publishing, sixth edition, 1983.

2.V. Krishnamurthy, V. P. Mainra and J. L. Arora, An Introduction to Linear Algebra, East West Press, 1976.

3.S. Narayan and P.K. Mittal, A Text Book of Matrices, S. Chand & Co, tenth edition, 1972.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)

Semester–VI

Session: 2024-25

Course Title: Mathematics (Numerical Analysis)

Course Code: BARM/BECM/ BCSM/BSNM-6333(II)

After passing this course, the students will be able to:

CO 1. Know how to find the roots of transcendental and polynomial equations.

CO 2. Perform computation for solving a system of equations.

CO 3. Learn how to interpolate the given set of values.

CO 4. Learn numerical solution of differential equations & compute numerical integration and differentiation, numerical solution of ordinary differential equations.

Bachelor of Arts/Bachelor of Science (Economics/Computer Science/Non-Medical)
Semester–VI
Session: 2024-25
Course Title: Mathematics (Numerical Analysis)
Course Code: BARM/BECM/ BCSM/BSNM-6333(II)

Examination Time: 3 Hours   Max. Marks:50
Theory:40
CA:10

Instructions for the Paper Setter: Eight questions of equal marks (8 marks each) are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section.

The students can use only Non Programmable& Non Storage Type Calculator.

Unit-I

Error generation, propagation, error estimation and error bounds, Solution of non-linear equations, Bisection method, Iteration method, Newton's Method, Generalized Newton's Method, Method of false position, Muller's method, Rate of convergence of these methods.

Unit-II

Solution of linear system of equation; Direct method, Gauss elimination variant (Gauss Jordan and Crout reduction), Triangular Method, Iterative Method, Jacobi's Method, Gauss Seidel Method. Finite Differences: Forward, Backward, Central, Divided differences, shift operator, relationship between the operators and detection of errors by use of difference operator. Interpolation with divided difference, Newton's formula, Lagrangian Method.

Unit-III

Finite difference interpolation, Gauss formula, Stirling formula, Bessel's formula, Error Estimation Extrapolation. Numerical differentiation, Method based on interpolation. Numerical Integration, Trapezoidal rule, Simpson's rule, Weddle rule, Romberg Integration, Gaussian integration method, Gaussian legendre integration. Double numerical integration.

Unit-IV

Numerical solution of ordinary differential equations, Initial value problem, Taylor's method, Euler's methods, Picard's method, Milne's Method, Runge-Kutta Method. Predictor-Corrector's Method.

Text Book:

M K Jain, S R K Iyenger, R K Jain, Numerical Methods for Scientific and Engineering Computation, New Age International Private Limited, Seventh edition, 2019.

Kanya Maha Vidyalaya, Jalandhar (Autonomous)

Scheme and Curriculum of Examinations of Five Years Integrated Programme

(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)

Master of Science (FYIP) Physics

Semester-I

Session- 2024-25

Master of Science (FYIP) Physics (Semester-I)									
Course Code	Course Title	Course Type	Hours per week L-T-P	L-T-P	Total Credits	Marks			Examination time (in Hours)
						Total	Ext.	CA	
							Th	P	
FPHL-1335	Mathematics-I	C	4-0-0	4-0-0	4	100	70	-	30	3

C-Compulsory

Semester–I
Session: 2024-25
Course Title: Mathematics-I
Course Code: FPHL-1335

Course outcomes

After the completion of this course, students should be able to :

CO 1: Give argument related to limits, continuity and derivative of a function and to understand the concept of maxima and minima of a function of a single variable.
CO 2: Explain the significance of Roll's theorem, Mean Value theorem, and Taylor's and Maclaurin's theorem to find the expansions of functions.
CO 3: Demonstrate the geometrical meaning of integral calculus as an area and volume.
CO 4: Introduce the concept of different types of Matrices and to understand the meaning of eigen values and eigen vectors with the process of diagonalization of Matrices.

Master of Science (FYIP) Physics

Semester–I
Session: 2024-25
Course Title: Mathematics-I
Course Code: FPHL-1335

Examination Time: 3 Hours   Max. Marks: 100
L T P   Theory: 70

4 0 0   CA: 30

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries **14 marks.**

UNIT –I
Functions and Derivatives: Limit, continuity and derivative of a function of one variable, geometrical significance of derivative, successive differentiation, Leibnitz theorem, maxima and minima of a function of single variable, partial derivatives, total derivative, chain rule.

UNIT –II
Differential Calculus: Rolle's theorem, mean value theorem, Taylor and Maclaurin formulas, Taylor series; concavity, point of inflexion, asymptotes.

UNIT-III
Anti derivatives: Indefinite integral as an anti derivative, method of substitution, partial fractions, integration by parts; reduction formulae; Definite integrals. Definite integral as a limit of a sum, geometrical interpretation; double and triple integrals.

UNIT-IV
Matrices: Orthogonal matrices, Hermitian matrices, Unitary matrices; Cayley Hamilton theorem and its applications; rank of a matrix, consistency of a system of linear equations, eigen values and eigenvectors, diagonalization of matrices.

<u>**Reference Books:**</u>
1. Differential Calculus: Shanti Narayan, New Delhi, Shyam Lal,1983.
2. Integral Calculus: Shanti Narayan, Delhi, S. Chand,1968.
3. Higher Engineering Mathematics: B.S. Grewal, Delhi, Khanna,1995.

Scheme and Curriculum of Examinations of Five Years Integrated Programme

(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)

Master of Science (FYIP) Physics

Semester-II

Session- 2024-25

Master of Science (FYIP) Physics (Semester-II)									
Course Code	Course Title	Course Type	Hours per week L-T-P	L-T-P	Total Credits	Marks			Examination time (in Hours)
						Total	Ext. Th	Ext. P	CA	
FPHL-2335	Mathematics-II	C	4-0-0	4-0-0	4	100	70	-	30	3

C-Compulsory

Master of Science (FYIP) Physics

Semester–II
Session: 2024-25
Course Title: Mathematics-II
Course Code: FPHL-2335

Course outcomes

After the completion of this course, students should be able to :

CO 1: Understand the concept of transformation and rotation of axes with the brief introduction of Conic section.

CO 2: Enhance their knowledge in the field of Solid Geometry.

CO 3: Explain the significance and Relation between the roots and co-efficients of polynomial equations and to identify the Solutions of biquadratic polynomial equations by Descartes and Ferrari's methods.

CO 4: Demonstrate the concept of Binary operations, Groups, Subgroups, Group table, Circle Group, Dihedral groups, Cyclic groups, Conjugate elements and Conjugacy classes,

Master of Science (FYIP) Physics

Semester–II
Session: 2024-25
Course Title: Mathematics-II
Course Code: FPHL-2335

Examination Time: 3 Hours   Max. Marks: 100
L T P   Theory: 70

4 0 0   CA: 30

Instructions for the Paper Setters:
Eight questions of equal marks are to be set, two in each of the four Sections (A-D). Questions of Sections A-D should be set from Units I-IV of the syllabus respectively. Questions may be subdivided into parts (not exceeding four). Candidates are required to attempt five questions, selecting at least one question from each section. The fifth question may be attempted from any Section. Each question carries **14 marks.**

UNIT –I
Coordinates Geometry(2D): Transformation of axes, shifting of origin, Rotation of axes, Parabola, Ellipse, Hyperbola and their properties; Tangent and normal, pair of tangents, Chord of contact for alltheconics; Identifications of curves represented by second degree equation (without derivation).

UNIT –II
Solid Geometry: Straight line and planes in Intersection of two and three planes, Intersection of a line and plane; Sphere, Section of a sphere by a plane, Intersection of a line and asphere, Intersection of two spheres; Right circular Cone, Right circular Cylinder, Tangent lines, Tangent planes, and normal lines to these surfaces.

UNIT –III
Polynomial equations: Relation between the roots and co-efficients of polynomial equations (in one variable), Horner's method, Transformation of equations and symmetric functions of roots, Descartes rule of signs, Newton's method of divisors, Cardano's method, Solutions of biquadratic polynomial equations by Descartes and Ferrari's methods.

UNIT –IV
Introduction to Groups: Binary operations, Groups, Subgroups, Group table, SU(2), SU(3), Heisenberg's Group, Circle Group, The Torus Group, Dihedral groups, Cyclic groups, Order of an element of a group, Conjugate elements and Conjugacy classes, Group Homomorphism and Isomorphism, Algebraic property, some standard algebraic properties (without proofs).

Reference Books:
1. S. Narayan, Coordinate Geometry, Sultan Chand &Sons(2005).

2. S. Narayan, Analytical Solid Geometry, Sultan Chand &Sons(2005).

3. B.S. Grewal, Higher Engineering Mathematics: Khanna Publishers, Delhi (1995).

4. Mohan Singh, Topics in Maths, Lakshmi Publication, New Delhi,(1997)

5. N. S. Gopalakrishnan.: University Algebra, New Age International Publishers.(2007)

Kanya Maha Vidyalaya, Jalandhar (Autonomous)
Scheme and Curriculum of Examinations of Five Years Integrated Programme
(Under Credit Based Continuous Evaluation Grading System) (CBCEGS)
Master of Commerce Under Five Year Integrated Programme(FYIP)
Semester -III
Session- 2024-25

Master of Commerce Under Five Year Integrated Programme(FYIP) Semester -III										
Course Code	Course Title	Course Type	Hours per week L-T-P	Credits L-T-P	Total Credits	Marks				Examination time (in Hours)
						Total	Ext. Th	P	CA	
FCOL -3331	Analytical Skills	C	4-0-0	4-0-0	4	100	80	-	20	3

C-Compulsory

Master of Commerce Under Five Year Integrated Programme (FYIP)
Semester -III
Session: 2024-25
Course Title: Analytical Skills
Course Code: FCOL-3331
Course Outcomes

After the successful completion of this course students will be able to

CO 1: Understand the concept of sequence and series, Clock problems, Blood Relationship.

CO 2: Demonstrate procedural fluency with real number arithmetic operations and use these operations to represent real world scenarios and to solve stated problems and Demonstrate number sense and conversion between fractions, decimals and percentages.

CO 3: Use simple and compound interest to do business calculations such as value of money, maturity value, present value, future value and able to differentiate which math method should be used for different problems.

CO 4: Analyse data being presented in the form of tables, Venn diagrams, pie charts.

Master of Commerce Under Five Year Integrated Programme (FYIP)
Semester -III
Session: 2024-25
Course Title: Analytical Skills
Course Code: FCOL-3331

Examination Time: 3 Hours   Max. Marks: 100
L-T-P   Theory: 80
4-0-0   CA: 20
Instructions for the Paper Setter:
Eight questions of equal marks are to be set, two in each of the four sections (A-D).
Questions of sections A-D should be set from Units I-IV of the syllabus respectively.
Questions may be subdivided into parts (not exceeding four). Candidates are required
to attempt five questions, selecting at least one from each section. The fifth question
may be attempted from any section. Each question will carry 16 marks.

UNIT-I

Data Analysis:- The data given in a Table, Graph, Bar Diagram, Pie Chart, Venn
diagram or a passage is to be analyzed and the questions pertaining to the data are to
be answered.

UNIT-II

Sequence and Series:- Analogies of numbers and alphabets completion of blank
spaces following the pattern in A:b::C: d relationship odd thing out; Missing number
in a sequence or a series.

UNIT-III

Arithmetic ability:- Algebraic operations BODMAS, Fractions, Divisibility rules,
LCM&GCD (HCF).

Date, Time and Arrangement Problems: Calendar Problems, Clock Problems, Blood
Relationship.

UNIT-IV

Quantitative aptitude:- Averages, Ratio and proportion, Problems on ages, Time,
distance, speed.

Business computations: -Percentages, Profit &loss, Partnership, simple and compound
interest.

Reference Books:

1. R S Agrawal, Quantitative Aptitude for Competitive Examination, S. Chand and
   company ltd., New Delhi, 2017

2. R V Praveen, Quantitative Aptitude and Reasoning, PHI Learning private
   limited, Delhi, Seventh Printing (Second edition) October, 2013

3. A. Guha, Quantitative Aptitude for Competitive Examination, Tata
   McGraw Hill publications, 6th edition.