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-I

Session: 2023-24

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester-I												
Programme Name	Course Code		Course Title	Course Type	Hours per week	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-1333 BECM-1333 BSNM-1333 BCSM-1333	(I)	Mathematics (Algebra)	E/C	4	4-0-0	4	100	80	-	20	3
Bachelor of Arts Bachelor of Science (Economics) Bachelor of Science (Non-Medical) Bachelor of	BARM-1333 BECM-1333 BSNM-1333 BCSM-1333	(II)	Mathematics (Calculus and Trigonometry)		3	3-0-0	3	75	60	-	15	3

Science (Computer Science												

C-Compulsory

E-Elective

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–I
Session: 2023-24
Course Title: Mathematics (Algebra)

Course Code: BARM/ BECM/ BCSM/ BSNM-1333(I)

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.

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Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–I
Session: 2023-24
Course Title: Mathematics (Algebra)
Course Code: BARM/ BECM/ BCSM/ BSNM-1333(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

Linear independence of row and column vectors. Row rank, Column rank of a matrix, Equivalence of column and row ranks, Nullity of matrix, 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

Eigen values, Eigen vectors, minimal and the characteristic equation of a matrix. Cayley Hamilton theorem and its use in finding inverse of a matrix. Quadratic Forms, quadratic form as a product of matrices. The set of quadratic forms over a field.

Unit–III

Congruence of quadratic forms and matrices. Congruent transformations of matrices. Elementary congruent transformations. Congruent reduction of a symmetric matrix. Matrix Congruence of skew–symmetric matrices. Reduction in the real field. Classification of real quadratic forms in 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 in one variable. Transformation of equations and symmetric function of roots, Descarte's rule of signs, Newton's Method of divisors, Solution of cubic equations by Cardon method, Solution of biquadratic equations by Descarte's and Ferrari's Methods.

Reference Books:

1. K.B. Datta: Matrix and Linear Algebra, Prentice Hall of India Pvt. Ltd., New Delhi (2003).

2. S. Narayan and P.K. Mittal : Text Book of Matrices, Sultan Chand & Co. Ltd., New Delhi, 11th edition, 2005.

3.S. Hall and S.R. Knight: Higher Algebra, Arihant Prakashan, Merrut.

4. C.Prasad, Text Book on Algebra and Theory of Equations, Pothishala Pvt. Ltd.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester-I
Session: 2023-24
Course Title: Mathematics (Calculus and Trigonometry)
Course Code: BARM/ BECM/ BCSM/ BSNM-1333(II)

Course Outcomes

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

CO 1: Understand real number system, lub & glb of set of real numbers, limit of a function, basic properties of limit & to apply it in real world problem. Analyse continuous and discontinuous function, Apply concept of continuity in uniform continuity.

CO 2: Manage to solve problems related to successive differentiation, Leibnitz theorem, Taylor's & Maclaurin's theorem with various forms of remainders and to use these expansion to compute values of Sine, Cosine, tangent or log function.

CO 3: Understand the concept of De Moivre's theorem & its applications. Identify circular, hyperbolic function and their inverses.

CO 4: Demonstrate exponential and logarithmic function of complex numbers, and to solve Gregory's series and summation of series.

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science)
Semester–I
Session: 2023-24
Course Title: Mathematics (Calculus and Trigonometry)
Course Code: BARM/ BECM/ BCSM/BSNM-1333(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

Real number system and its properties, lub, glb of sets of real numbers, limit of a function, Basic properties of limits, Continuous functions and classification of discontinuities, Uniform continuities.

Unit-II

Differentiation of hyperbolic functions, Successive differentiation, Leibnitz theorem, Taylor's and Maclaurin's theorem with various forms of remainders, Indeterminate forms.

Unit-III

De–Moivre's Theorem and its applications, circular and hyperbolic functions and their inverses.

Unit-IV

Exponential and Logarithmic function of a complex numbers, Expansion of trigonometric functions, Gregory's series, Summation of series.

Text Book:

1. G. B. Thomas and R .L. Finney, Calculus and Analytic Geometry, Pearson, Ninth edition, 2016.

Reference Books:

1. E. Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons, New Delhi, Eighth edition,2010.

2. N. Piskunov, Differential and Integral Calculus, Peace Publishers, Moscow, 1969.

3. G. Prasad, Differential Calculus, Pothishala Pvt. Ltd., Allahabad, 1950.

4. S. L. Loney, Plane trigonometry part –II, Cambridge university press, 1948.

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-II

Session: 2023-24

Bachelor of Arts/ Bachelor of Science (Economics, Non-Medical, Computer Science) Semester-II												
Programme Name	Course Code		Course Title	Course Type	Hours per week	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-2333 BECM-2333 BSNM-2333 BCSM-2333	(I)	Mathematics (Calculus and Differential Equations)	E/C	4	4-0-0	4	100	80	-	20	3
Bachelor of Arts Bachelor of Science (Economics) Bachelor of Science (Non-Medical) Bachelor of Science	BARM-2333 BECM-2333 BSNM-2333 BCSM-2333	(II)	Mathematics (Calculus)		3	3-0-0	3	75	60	-	15	3

(Computer Science												

C-Compulsory

E-Elective

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

Semester–II

Session: 2023-24
Course Title: Mathematics (Calculus and Differential Equations)

Course Code: BARM/BECM/ BCSM/BSNM-2333(I)

Course Outcomes

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

CO 1: Demonstrate Asymptotes, points of inflexion, multiple points, concavity and convexity of a curve and apply these concepts in curve tracing.

CO 2: Find arc length of a curve and able to establish reduction formulae for various functions.

CO 3: Understand concept of Exact Differential Equations and demonstrate the geometrical meaning of a differential equation & orthogonal trajectories.

CO 4: Understand the concept of linear differential equation with constant and variable coefficients and to apply in a wide variety of disciplines like Bio, Eco, Physics and Engineering. Manage to solve the problem related to series solution of differential equations like Bessel and Legendre equation by Power series method.

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

Semester–II

Session: 2023-24
Course Title: Mathematics (Calculus and Differential Equations)

Course Code: BARM/BECM/ BCSM/BSNM-2333(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

Asymptotes, Tests for concavity and convexity, Points of inflexion, Multiple Points, Curvature, Tracing of Curves (Cartesian and Parametric coordinates only).

Unit-II

Integration of hyperbolic functions. Reduction formulae. Definite integrals. Fundamental theorem of integral calculus. Quadrature, rectification.

Unit– III

Exact differential equations. First order and higher degree equations solvable for x,y,p. Clairaut's form and singular solutions. Geometrical meaning of a differential equation. Orthogonal trajectories.

Unit-IV

Linear differential equations with constant and variable coefficients. Variation of Parameters method, reduction method, series solutions of differential equations. Power series method, Bessel and Legendre equations (only series solution).

Text Book:

O.P.Chug, P. Gupta and R.S.Dahiya, Topics in Mathematics: Calculus and Differential Equations, Laxmi Publications Private Ltd.

Reference Books:

1. D.A.Murray, Introductory Course in Differential Equations, Orient Longman Private Limited, Hyderabad, 11th edition,2003.
2. G.F.Simmons, Differential Equations, McGraw Hill Education, 2nd edition, 2017.
3. G. Prasad: Integral Calculus, Pothishala Pvt. Ltd., Allahabad, 2015.
4. E. Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 8th edition, 2010.

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

Semester–II

Session: 2023-24
Course Title: Mathematics (Calculus)

Course Code: BARM/BECM/ BCSM/BSNM-2333(II)

Course Outcomes

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

CO 1: Differentiate between limit and continuity of function of two variables and apply this concept in partial derivatives & differentiability of real valued function of two variables. Application of inverse & implicit function theorems.

CO 2: Manage to solve problems related to Maxima, Minima & Saddle points of functions of two variables. Classify Envelopes & Evolutes.

CO 3: Understand the concept of Double and Triple integrals.

CO 4: Apply double and triple integral to evaluation of areas, volumes, surfaces of solid of revolution and to find out area and volume of plane and solid figure.

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

Semester–II

Session: 2023-24

Course Title: Mathematics (Calculus)

Course Code: BARM/BECM/ BCSM/BSNM-2333(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

Limit and Continuity of functions of two variables, Partial differentiation, Change of variables, Partial derivatives and differentiability of real–valued functions of two variables, Schwartz's and Young's Theorem, Statements of Inverse and implicit function theorems and applications.

Unit-II

Euler's theorem on homogeneous functions, Taylor's theorem for functions of two variables, Jacobians, Envelopes. Evolutes, Maxima, Minima and saddle points of functions of two variables.

Unit-III

Lagrange's undetermined multiplier method, Double and Triple Integrals, Change of variables, Change of order of integration in double integrals.

Unit-IV

Application to evaluation of area, volume, surface of solids of revolutions.

Text Book:

G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Addison Wesley, 1998

Reference Books:

1. S. Narayan and P.K. Mittal, Integral Calculus, Sultan Chand & Sons, New Delhi, 1983.

2.E. Kreyszig, Advanced Engineering Mathematics, John Wiley and Sons, New Delhi, eighth edition, 2010

3. S. Narayan and P.K. Mittal, Differential Calculus, Sultan Chand & Sons, Jalandhar, 1956.