POOMPUHAR COLLEGE (AUTONOMOUS)
OF THE TAMIL NADU HR & CE DEPARTMENT
MELAIYUR - 609 107

B.Sc Mathematics – Course Structure under CBCS
(For the candidates admitted from the academic year 2023 -2024 onwards)

Part	Study Components & Course Title	Credit	Hours/Week	Maximum Marks		
				CIA	ESE	Total
	SEMESTER – I					
I	Language – I: பொதுதமிழ்– I	3	6	25	75	100
II	General English – I	3	6	25	75	100
III	Core – I :Algebra & Trigonometry	5	5	25	75	100
	Core –II : Differential Calculus	4	4	25	75	100
	Elective - I (Generic / Discipline Specific) Chemistry –I	2	3	25	75	100
	Chemistry Practical –I	2	2	25	75	100
IV	Skill Enhancement Course – 1(NME-I)	2	2	25	75	100
	Foundation Course**:** Bridge Mathematics	2	2	25	75	100
	Total	**23**	**30**			**800**
	SEMESTER – II					
I	Language – II பொதுதமிழ்– II	3	6	25	75	100
II	General English – II	3	6	25	75	100
III	Core – III:Analytical Geometry of Three Dimensions	5	5	25	75	100
	Core –IV: Integral Calculus	4	4	25	75	100
	Elective - II (Generic / Discipline Specific) Chemistry –II	2	3	25	75	100
	Chemistry Practical –II	2	2	25	75	100
IV	Skill Enhancement Course – 2 (NME-II)	2	2	25	75	100
	Skill Enhancement Course – 3 Internet and its Applications (Common Paper)	2	2	25	75	100
	Total	**23**	**30**			**800**

Non-major (NME) Electives offered to other Departments

IV	Basic Mathematics – I	2	2	25	75	100
	Basic Mathematics – II	2	2	25	75	100

Question Paper Pattern (for Part I, II, III, IV)

Part A

Ten questions 10 x 2 = 20 marks
(Two questions from each unit – No choice)

Part B

Five questions (either or type) 5 x 5 = 25 marks
(One question from each unit)

Part C

Three questions out of five 3 x 10 = 30 marks
(One question from each unit)

Total 75 marks

Question Paper Pattern (for Non Major Elective Papers Basic Mathematics – I and Basic Mathematics - II only)

Fifty questions out of Seventy five 50 x 1.5 = 75 marks
((Fifteen questions from each unit)

Total 75 marks

Signature of the Subject Experts **Signature of the HOD**

YEAR - I	22au:04m1	HRS – 5
SEMESTER – I	ALGEBRA AND TRIGONOMETRY	
CORE – 1		CREDIT – 5

Course Objectives:

- Basic ideas on the Theory of Equations, Matrices and Number Theory.
- Knowledge to find expansions of trigonometry functions, solve theoretical and applied problems.

Unit I: Reciprocal Equations - Standard form – Increasing or decreasing the roots of a given equation - Removal of terms - Approximate solutions of roots of polynomials by Horner's method – related problems.

Unit II: Binomial – Exponential – Logarithmic series (Theorems without proof) – **Summation of Series related problems only.**

Unit III: Rank of a Matrix - Characteristic equation – Eigen values and Eigen Vectors - Cayley – Hamilton Theorem (Statement only) - Finding powers of square matrix, Inverse of a square matrix up to order 3 – **(Except Similar and Diagonalization)** - related problems.

Unit IV: Expansions of $\sin n\theta$, $\cos n\theta$ in terms of powers of $\sin\theta$ and $\cos\theta$ - Expansion of $\tan n\theta$ in terms of $\tan\theta$ - Expansions of $\cos^n\theta$, $\sin^n\theta$, $\cos^m\theta\sin^n\theta$ –- Expansions of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in terms of θ - related problems.

Unit V: Hyperbolic functions – Relation between circular and hyperbolic functions - Inverse hyperbolic functions - related problems.

Text Books:

1. T. K. ManickavasagamPillay, T. Natarajan and K. S. Ganapathy, Algebra Volume I, S. Viswanathan (Printers & Publishers) Pvt. Ltd., Reprint 2011.
   UNIT I: Chapter-VI: Sec (16-19 and 30)
   UNIT II: Chapter-III Sec (10) and Chapter – IV Sec (3 and 9)
2. T. K. ManickavasagamPillay, T. Natarajan and K. S. Ganapathy, Algebra Volume II, S. Viswanathan (Printers & Publishers) Pvt. Ltd., Reprint 2012.
   UNIT III: Chapter-II Sec (11 to 13 and 16, 16.3, 16.4)
3. S. Arumugam, A.ThangapandiIssac, Theory of Equations and Trigonemetry, New Gamma Publishing House, 2006.
   UNIT IV: Chapter- 6: Sec (6.1 to 6.3)
   UNIT V: Chapter- 7: Sec (7.1 to 7.2)

Reference Books:

1. W.S. Burnstine and A.W. Panton, Theory of equations
2. David C. Lay, Linear Algebra and its Applications, 3rd Ed., Pearson Education Asia, Indian Reprint, 2007
3. G.B. Thomas and R.L. Finney, Calculus, 9th Ed., Pearson Education, Delhi, 2005
4. C. V. Durell and A. Robson, Advanced Trigonometry, Courier Corporation, 2003
5. J. Stewart, L. Redlin, and S. Watson, Algebra and Trigonometry, Cengage Learning, 2012.
6. Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.
7. A.Singaravelu Allied Mathematics (Paper II), A.R Publications, 2003.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Classify and Solve reciprocal equations

CLO 2: Find the sum of binomial, exponential and logarithmic series

CLO 3: Find Eigen values, eigen vectors, verify Cayley – Hamilton theorem.

CLO 4: Expand the powers and multiples of trigonometric functions in terms of sine and cosine

CLO 5: Determine relationship between circular and hyperbolic functions.

Outcome Mapping:

	POs						**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	1	3	-	-	-	3	2	1
CLO2	2	1	3	1	-	-	3	2	1
CLO3	3	1	3	1	-	-	3	2	1
CLO4	3	1	3	-	-	-	3	2	1
CLO5	3	1	3	-	-	-	3	2	1

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YEAR - I	23AU:04M2 DIFFERENTIAL CALCULUS	HRS – 4
SEMESTER – I		
CORE – II		CREDIT – 4

Course Objectives:

- The basic skills of differentiation, successive differentiation, and their applications.
- Basic knowledge on the notions of curvature, evolutes, involutes and polar co-ordinates and in solving related problems.

UNIT – I: Successive Differentiation: Introduction (Review of basic concepts) – The n^{th} derivative – Standard results – Fractional expressions – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product.

UNIT – II: Partial Differentiation: Partial derivatives – Successive partial derivatives – Function of a function rule – Total differential coefficient – A special case – Implicit Functions.

UNIT – III: Partial Differentiation (Continued): Partial derivatives of a function of two variables – Maxima and Minima of functions of two variables - Lagrange's method of undetermined multipliers.

UNIT – IV: Envelope: Method of finding the envelope – Another definition of envelope – Envelope of family of curves which are quadratic in the parameter.

UNIT – V:Curvature: Definition of Curvature – Circle, Radius and Centre of Curvature – Evolutes and Involutes.

Text Book:

1. S.Narayanan and T.K.ManicavachagomPillai, Calculus Volume I, S.Viswanathan (Printers & Publishers) PvtLimited , 2014.

   UNIT I:Chapter – III: Section – 1.1 to 1.6 and 2.1 to 2.2

   UNIT II:Chapter – VIII : Section – 1.1 to 1.5

   UNIT III: Chapter – VIII : Section –1.7, Section 4, Section 5.

   UNIT IV: Chapter – X : Section – 1.1 to 1.4

   UNIT V:Chapter – X : Section – 2.1 to 2.5

Reference Books:

1. R. Courant and F. John, Introduction to Calculus and Analysis (Volumes I & II), Springer- Verlag, New York, Inc., 1989.
2. T. Apostol, Calculus, Volumes I and II.
3. S. Goldberg, Calculus and mathematical analysis.
2. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.
3. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2010.
4. M.J. Strauss, G.L. Bradley and K. J. Smith, Calculus, 3rd Ed., Dorling Kindersley (India) P. Ltd. (Pearson Education), Delhi, 2007

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Find the nth derivative, form equations involving derivatives and apply Leibnitz formula

CLO 2: Find the partial derivative and total derivative coefficient

CLO 3: Determine maxima and minima of functions of two variables and to use the Lagrange's method of undetermined multipliers

CLO 4: Find the envelope of a given family of curves

CLO 5: Find the evolutes and involutes

Outcome Mapping:

	POs						**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	1	3	-	-	-	3	2	1
CLO2	2	1	3	-	-	-	3	2	1
CLO3	3	2	3	2	-	-	3	2	1
CLO4	3	2	3	2	1	-	3	2	1
CLO5	3	2	3	2	1	-	3	2	1

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YEAR – I	23AU:08NME1	HRS – 2
SEMESTER –I		
NON-MAJOR ELECTIVE – 1	BASIC MATHEMATICS - I	CREDIT – 2

Course Objectives:

Students can be given practice to solve all kinds of problems arise day today life in Science, technology and Business Using the concepts of number system, HCF and LCM, average, ratio, proportion, and partnership.

UNIT I: Number System

UNIT II: H.C.F and L.C.M of Numbers

UNIT III: Average

UNIT IV: Partnership

UNIT V: Calendar and Clocks

Text Book:

1. Quantitative Aptitude – Dr.R.S.Aggarwal, S. Chand Publications, Revised and Enlarged Edition 2017.

UNIT I:Pages from 3 to 25
UNIT II: Pages from 51 to 68
UNIT III: Pages from 206-239
UNIT IV:Pages from 476 to 492
UNIT V: Pages from 819 to 833

Reference Books:

1. Quantitative Aptitude for Competitive Examinations- AbhijitGuha,Third Edition (2006),Tata McGraw Hill publishing Company Ltd., New Delhi.
2. Course in Quantitative Aptitude for Competitive Examinations- Agarwal P. K, First Edition (2002), Cyber-tech Publications, New Delhi.
3. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publications,2004

Course Outcomes:

Onsuccessfulcompletionof thecourse,thestudents willbeableto:

CLO1: Understand the nature of number system
CLO2: Compute the HCF an LCM of given numbers
CLO3: Calculate the average of given values.
CLO4 :Understand the concepts of Partnership.
CLO5: Calculate calendar and clocks.

Outcome Mapping:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	1	3	1	1	2	3	3	1
CLO2	2	3	3	1	-	2	3	2	1
CLO3	3	3	3	3	-	-	3	3	1
CLO4	3	2	3	2	3	-	3	3	1
CLO5	3	2	3	2	3	-	3	3	1

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YEAR - I	23AU:04FC BRIDGE MATHEMATICS	HRS – 2
SEMESTER – I		
FOUNDATION COURSE		CREDIT – 2

Course Objectives:

- To bridge the gap and facilitate transition from higher secondary to tertiary education;
- To instil confidence among stakeholders and inculcate interest for Mathematics;

UNIT-I: Algebra: Binomial theorem, General term, middle term, problems based on these concepts - **Problems only.**
NCERT Class 11 Mathematics: Chapter 7

Unit II: Sequences and series (Progressions) - **Problems only.**
NCERT Class 11 Mathematics: Chapter 8

Unit III: Permutations and combinations, Fundamental principle of counting. Factorial n. Derivation of formulae and their connections, simple applications, combinations with repetitions, arrangements within groups, formation of groups - **Problems only.**
NCERT Class 11 Mathematics: chapter 6

Unit IV: Trigonometry: Introduction to trigonometric ratios – Problems on sin(A+B), cos(A+B), tan(A+B) formulae - Problems on inverse trigonometric functions, sine rule and cosine rule – **Proofs not included.**
NCERT Class 11 Mathematics: Chapter 3
NCERT Class 12 Mathematics: Chapter 2

Unit V: Calculus: Standard formulae and problems, differentiation, uv rule, u/v rule, methods of differentiation - Integration - product rule and substitution method - **Proofs not included.**
NCERT Class 12 Mathematics: Chapter 12

Text Book:

1. NCERT class XI and XII text books.

Course Learning Outcome

After completion of this course successfully, the students will be able to

CLO 1: Prove the binomial theorem and apply it to find the expansions of any $(x + y)^n$ and also, solve the related problems

CLO 2: Find the various sequences and series and solve the problems related to them.

CLO 3: Find the number of permutations and combinations in different cases. Apply the principle of counting to solve the problems on permutations and combinations

CLO 4: Explain various trigonometric ratios and find them for different angles, including sum of the angles. Also, they can solve the problems using the transformations.

CLO 5: Find the derivative of a function at a point.

Outcome Mapping:

	POs						PSOs	
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**
CLO1	3	1	3	1	2	1	1	3
CLO2	2	3	1	2	2	3	2	1
CLO3	3	3	2	2	2	1	2	1
CLO4	2	3	3	2	1	3	2	1
CLO5	1	2	3	1	3	3	2	1

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YEAR - I	ANALYTICAL GEOMETRY OF THREE DIMENSIONS	HRS – 5
SEMESTER – II		
CORE – III		CREDIT – 5

Course Objectives:

- Necessary skills to analyze characteristics and properties of two- and three-dimensional geometric shapes.
- To present mathematical arguments about geometric relationships.
- To solve real world problems on geometry and its applications.

UNIT-I: Rectangular cartesian co-ordinates:

Direction cosines of a line - Angle between two lines – Projections -Direction cosines - Direction ratios -Conditions for perpendicularity and parallelism

UNIT-II: System of Planes - Length of the perpendicular –Orthogonal projection.

UNIT-III: Representation of line – Angle between a line and a plane – Co – planar lines – Shortest distance between two skew lines –Length of the perpendicular.

UNIT-IV: Equation of a sphere - General equation - Section of a sphere by a plane - Equation of the circle - Tangent plane - Angle of intersection of two spheres - Condition for the orthogonality - Radical plane.

UNIT-V : The Central Quadrics and Cone : The equation of a surface – Cone - Right circular cone - Intersection of a straight line and a quadric cone - Tangent plane and normal - Condition that the cone has three mutually perpendicular generators.

Text Book:

1. T.K. ManickavachagomPillai and T. Natarajan. A Text Book Of Analytical Geometry (Part II-Three Dimensions) Viswanathan (Printers & Publishers), Pvt. Ltd, 2008.

   UNIT I:Chapter 1 : Section 1 to 12
   UNIT II:Chapter 2 : Section 1 to 11
   UNIT III:Chapter 3 : Section 1 to 8
   UNIT IV:Chapter 4 : Section 1 to 8
   UNIT V:Chapter 5 : Section 1to 7

Reference Books:

1. S. L. Loney, Co-ordinate Geometry.
2. Robert J. T. Bell, Co-ordinate Geometry of Three Dimensions.
3. William F. Osgood and William C. Graustein, Plane and Solid Analytic Geometry, Macmillan Company, New York, 2016.Calculus and Analytical Geometry, G.B. Thomas and R. L. Finny, Pearson Publication, 9th Edition, 2010.
4. Robert C. Yates, Analytic Geometry with Calculus, Prentice Hall, Inc., New York,

1961.

5. Earl W. Swokowski and Jeffery A. Cole, Algebra and Trigonometry with Analytic Geometry, Twelfth Edition, Brooks/Cole, Cengage Learning, CA, USA, 2010.
6. William H. McCrea, Analytical Geometry of Three Dimensions, Dover Publications, Inc, New York, 2006.

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Find the angle between the lines and direction cosines

CLO 2: Find the system of planes and orthogonal production.

CLO 3: Explain in detail the system coplanar lines and skew lines.

CLO 4: Explain in detail the system of spheres.

CLO 5: Explain in detail the system of central quadrics and cone.

Outcome Mapping:

	POs						**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	2	2	2	1	-	-	3	2	1
CLO2	2	2	2	1	-	-	3	2	1
CLO3	3	2	2	1	-	-	3	2	1
CLO4	3	2	3	1	-	-	3	2	1
CLO5	3	2	3	1	-	-	3	2	1

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YEAR - I	INTEGRAL CALCULUS	HRS – 4
SEMESTER – II		
CORE – IV		CREDIT – 4

Course Objectives:

- Knowledge on integration and its geometrical applications, double, triple integrals and improper integrals.
- Knowledge about Beta and Gamma functions and their applications.
- Skills to Determine application of integral calculus.

UNIT-I: Reduction formulae -Types, Integration of product of powers of algebraic and logarithmic functions - Bernoulli's formula.

UNIT-II: Multiple Integrals - Definition of double integrals - Evaluation of double integrals – Change of order of integration -Double integrals in polar coordinates.

UNIT-III: Triple integrals – Applications of multiple integrals - Volumes of solids of revolution - Change of variables :Jacobian – Two important results regarding Jacobians – Change of variable in the case of two and three variables – Transformation from Cartesian to polar coordinates.

UNIT-IV: Beta and Gamma functions – Infinite integral – Definitions – recurrence formula of Gamma functions – Properties of Beta and Gamma functions - Relation between Beta and Gamma functions - Applications.

UNIT-V: Geometric and Physical Applications of Integral calculus.

Text Book:

1. S.Narayanan and T.K.ManicavachagomPillai, Calculus Volume II, S.Viswanathan (Printers&Publishers) PvtLimited , Chennai (2013).

   UNIT I: Chapter 1: Section – 13.1 to 13.5, 13.10,15.1

   UNIT II: Chapter 5 : Section – 1, 2.1 to 2.2, 3.1

   UNIT III: Chapter 5: Section 4, 5.1 to 5.4, 6.1 ,Chapter 6 : Section 1.1,1.2, 2.1 to 2.3

   UNIT IV:Chapter 7: Section 2.1 to 2.3 ,3, 4, 5

   UNIT V: Chapter 2 : Section 1.1 to 1.3, 2.1,2.2 , Chapter 3 : Section 1.1 to 1.3

Reference Books:

1. H. Anton, I. Birens and S. Davis, Calculus, John Wiley and Sons, Inc., 2002.

2. G.B. Thomas and R.L. Finney, Calculus, Pearson Education, 2007.
3. D. Chatterjee, Integral Calculus and Differential Equations, Tata-McGraw Hill Publishing Company Ltd.
4. P. Dyke, An Introduction to Laplace Transforms and Fourier Series, Springer Undergraduate Mathematics Series, 2001 (second edition).

Course Learning Outcome (for Mapping with POs and PSOs)

Students will be able to

CLO 1: Determine the integrals of algebraic, trigonometric and logarithmic functions and to find the reduction formulae

CLO 2: Evaluate double and triple integrals and problems using change of order of integration

CLO 3: Solve multiple integrals and to find the areas of curved surfaces and volumes of solids of revolution

CLO4: Explain beta and gamma functions and to use them in solving problems of integration

CLO 5: Explain Geometric and Physical applications of integral calculus

Outcome Mapping:

	POs						**PSOs**		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	1	3	-	-	-	3	2	1
CLO2	3	1	3	-	-	-	3	2	1
CLO3	3	1	3	-	-	-	3	2	1
CLO4	3	1	3	-	-	-	3	2	1
CLO5	3	1	3	-	2	1	3	2	1

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YEAR - I	BASIC MATHEMATICS – II	HRS – 2
SEMESTER –II		
NON-MAJOR ELECTIVE – II		CREDIT – 2

Course Objectives:

To enhance the problem solving techniques in real life applications of mathematical concepts Time, work, distance, Boats and Stream, Alligation or Mixture, permutation and combination.

UNIT I: Time and Work

UNIT II: Time and Distance

UNIT III: Boats and Streams

UNIT IV: Alligation(Mixture)

UNIT V: Permutations and Combinations

Text Book:

1. Quantitative Aptitude – Dr.R.S.Aggarwal, S. Chand Publications, Revised and Enlarged Edition 2017.

Unit-I:Pages from 526 to 561
Unit-II:Pages from 562 to 599
Unit-III: Pages from 600 to 611
Unit-IV: Pages from 633 to 640
Unit-V:Pages from 841 to 849

Reference Books:

1. Quantitative Aptitude for Competitive Examinations- AbhijitGuha,Third Edition(2006),Tata McGraw Hill publishing Company Ltd., New Delhi.
2. Course in Quantitative Aptitude for Competitive Examinations- Agarwal P. K, First Edition (2002), Cyber-tech Publications, New Delhi
3. Fast Track Objective Arithmetic, Rajesh Verma, Arihant Publications,2004

Course Outcomes:

Onsuccessfulcompletionofthecourse,thestudentswillbeableto:

CLO1: Solve problems on time and work.
CLO2: Calculate time and distance for real word problems.
CLO3: Compute the speed of boats and streams.
CLO4: Calculate the mixing of water in milk
CLO5: Solve problems on permutation and combination.

Outcome Mapping:

	POs						PSOs		
	1	**2**	**3**	**4**	**5**	**6**	**1**	**2**	**3**
CLO1	3	1	3	1	1	2	3	2	1
CLO2	2	3	3	1	-	2	3	2	1
CLO3	3	3	1	1	-	-	3	2	1
CLO4	2	2	3	2	3	-	3	2	1
CLO5	3	1	3	2	3	-	3	2	1

Signature of the Subject Experts **Signature of the HOD**

YEAR – I	MATHEMATICS – I (for Chemistry / Physics)	HRS – 5
SEMESTER – I		
PART: III ELECTIVE: I		CREDIT – 4

Course Objectives:

To acquire knowledge on finding roots of the Transcendental and Algebraic equations by Numerical methods, applications of matrices and numerical methods for solving simultaneous linear equations. To understand the computations of eigenvalues, eigenvectors, differential calculus, the evaluation of integral using reduction formula.

- To acquire knowledge on finding the solutions of Transcendental, Algebraic and Simultaneous Equations.
- Analyze and apply the notions of differentiability and integrability of algebraic and transcendental equations.
- To find and use eigenvalues and eigenvectors of matrix.

UNIT-I: Differential Calculus

n-th derivatives – Leibnitz theorem [without proof] and applications – Curvature and radius of curvature in Cartesian co-ordinates

UNIT- II:Reduction Formula

1) $\int sin^n x dx$ 2) $\int_0^{\frac{\pi}{2}} \sin^n x dx$ 3) $\int \cos^n x dx$ 4) $\int_0^{\frac{\pi}{2}} \cos^n x dx$

5) Without proof $\int_0^{\frac{\pi}{2}} \sin^n x \cos^m x dx$ - and illustrations 6) $\int tan^n x\, dx$ 7) $\int_0^{\frac{\pi}{4}} tan^n x dx$.

UNIT – III: Matrices

Rank of a matrix - Characteristic equation of a square matrix– Eigen values and eigen vectors – Cayley – Hamilton theorem [without proof].

UNIT – IV: Solutions of Transcendental and Algebraic Equations

Iteration method**,** Bisection method, Newton's method - RegulaFalsi method, (Theorems and errors not needed,Simple problems only).

UNIT – V:Solutions of Simultaneous Equations

Gauss Elimination method- Gauss Jordan method-Gauss Seidel Iterative method-Gauss Jacobi method (Restricted to three variables only) (Simple problems only)

Text Books:

1. Dr A, Singaravelu, "Allied Mathematics(common to all university)" , Meenakshi Agency(2011).
   Unit- I: Chapter 5 – Page 5.1 – 5.19, 5.52 - 5.60.
   Unit- II: Chapter 7 – Page 7.89 – 7.105.
   Unit-III: Chapter 2 – Page 2.23 – 2.28, 2.70 – 2.96, 2.122-2.132

2. S.S Sastry "Introductory Methods of Numerical Analysis"Prentice Hall of India Publications, Fourth edition.
   Unit- IV: Chapter 2 – Page 20 - 37.

Unit - V: Chapter 6 & 8 – Page 257 – 261& 339.

Reference Books:

1. P. Balasubramanian and K. G. Subramanian. 1997, "Ancillary Mathematics", Vol I & II. New Delhi: Tata McGraw Hill.
2. S.P.Rajagopalan and R.Sattanathan(2005), "Allied Mathematics", Vol I & II. New Delhi: Vikas Publications.
3. P. R. Vittal (2003), "Allied Mathematics",Chennai: Marghan Publications.

Course Outcomes:

On successful completion of the course, the students will be able to

CO1: Provide skills on finding curvature and radius of curvature in Cartesian and polar co-ordinates.
CO2:Understand the concepts of the reduction formula.
CO3: Adopt techniques in solving problems involving Matrices
CO4: Attain the knowledge on finding approximate root for polynomial equations using Numerical methods.
CO5: Develop the skills of finding solutions of Simultaneous Linear equations.

Outcome Mapping:

CO / PO	POs				
	1	**2**	**3**	**4**	**5**
CO1	3	3	3	3	2
CO2	2	3	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	2	2
CO5	3	2	3	3	2

1-Low 2-Moderate 3- High

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YEAR - I	MATHEMATICS – II (for Chemistry / Physics)	HRS – 5
SEMESTER – II		
PART: III ELECTIVE: II		CREDIT – 4

Course Objectives:

To expand trigonometric functions, solving partial differential equations and learn about vector differentiation and integration, also too familiar with physical interpretation of divergence and curl of a vector. Learning finite differences and applications of interpolations in real life situations.

UNIT - I: Partial Differential Equations

Formation of partial differential equations, elementary partial differential equations-Lagrange's equations.

UNIT- II:Trigonometry

Expansions of $\sin^n\theta$, $\cos^n\theta$, $\sin n\theta$, $\cos n\theta$, $\tan n\theta$ – Expansions of $\sin\theta$, $\cos\theta$, $\tan\theta$ in terms of θ

UNIT –IIIVector Differentiation

Scalar and Vector, Vector differentiation – velocity & acceleration Vectors – Gradient and its properties - directional derivative – unit normal vector – scalar Potential.

UNIT – IV Operators in Vector Differentian

Divergence , Curl – Solenoidal and irrotational vectors - Double operators- properties connecting gradient, divergence, and curl of a vector(simple properties only).

UNIT-V: Finite Differences

Operator E, Relation between Δ, ∇ and E – Interpolation – Newton – Gregory forward & backward formulae for interpolation-Lagrange's interpolation formula for unequal intervals(without proof) .

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Text Books:

1. P. Duraipandian and S. Udayabaskaran, "Allied Mathematics", Vol II.
   UNIT I: Chapter 6 – Page 336 – 344, 367 – 381.
2. Dr A, Singaravelu, "Allied Mathematics(common to all university)" , Meenakshi Agency(2011)
   UNIT II: Chapter:6 – Page 6.5 – 6.30.
3. Dr A, Singaravelu, "Allied Mathematics Paper– I " , Meenakshi Agency(2002)
   UNIT III: Chapter 5 – Page 5.1 – 5.10.
   UNIT IV: Chapter 5 – Page 5,20 – 5.36, 5.37 – 5.55.
4. S.S Sastry "Introductory Methods of Numerical Analysis"Prentice Hall of India Publications, Fourth edition.
   UNIT V: Chapter 3 – Page 65-66, 68-70,73-79,91-96.

Reference Books:

1. P. Balasubramanian and K. G. Subramanian. 1997, "Ancillary Mathematics", Vol I & II. New Delhi: Tata McGraw Hill.

2. S.P.Rajagopalan and R.Sattanathan(2005), "Allied Mathematics", Vol I & II. New Delhi: Vikas Publications.
3. P. R. Vittal (2003), "Allied Mathematics",Chennai: Marghan Publications.
4. P.Kandhasamy, K. Thilagavathy (2003), "Allied Mathematics" Vol I & II, New Delhi: Tata McGraw Hill.

Course Outcomes:

On successful completion of the course, the students will be able to

CO1: Provide a basic knowledge of Partial Differential equations and develops knowledge on handle practical problems.
CO2: Attain knowledge on finding the expansions of trigonometric functions.
CO3: Adopt techniques in solving problems involving vector and scalar functions
CO4: Provide skills on finding derivatives and gradients on vector differentiation.
CO5: Understand the concept of finitedifferences.

Outcome Mapping:

CO / PO	PO				
	1	**2**	**3**	**4**	**5**
CO1	3	2	3	3	2
CO2	3	3	3	2	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

Signature of the Subject Experts **Signature of the HOD**

YEAR – I	NUMERICAL METHODS (FOR B.C.A)	HRS – 5
SEMESTER – I		
PART: III ELECTIVE : I		CREDIT – 4

Course Objectives:

The course aims to introduce the concepts of Finite differences, Central differences, Interpolation for unequal intervals, Inverse interpolation and Solutions of simultaneous linear equations.

UNIT- I: Finite Differences

First and higher order differences-forward differences and Backward differences-Interpolation – Newton – Gregory forward & backward formulae for interpolation – Estimating the Missing terms (No derivations of formulae, simple problems only).

UNIT-II: Central Differences

Central difference Operators – Central differences formulae: Gauss Forward and Backward formulae – Stirling's formula – Bessel's formula (No derivations of formulae, simple problems only).

UNIT – III: Interpolation for Unequal Intervals and Inverse Interpolation

Divided differences – Newton's divided differences formula and Lagrange's formula [without proof] – Inverse Lagrange's interpolation.

UNIT – IV: Solution of Simultaneous Equation

Gauss Elimination method – Gauss Jordan Method,-Gauss Seidalmethod[Three unknowns only].

UNIT – V: Initial Value Problems for ODE

Euler's method, Euler's modified method, solving First order differential equation using Rungekutta method.

Text Book:

1. A. Singaravelu [New Edition January - 2009], "Numerical Methods", Meenakshi Agency, Chennai.

Unit- I: Chapter: 2 - Pages 2.1 – 2.4, 2.8 – 2.33.
Unit- II: Chapter: 2 - Pages 2.34 – 2.52, 2.58 – 2.60.
Unit –III: Chapter: 2 - Pages 2.98 – 2.139.
Unit –IV: Chapter: 1- Pages 1.58 – 1.71, 1.78 – 1.93.
Unit -V: Chapter: 4 - Pages 4.21 – 4.57.

Reference Books:

1. S.Arumugham (2003), "Numerical Methods", New Gamma Publishing, Palayamkottai.
2. H.C.Saxena (1991), "Finite differences and Numerical Analysis", S.Chand& Co. Delhi

3. B.D.Gupta (2001), “Numerical Analysis”, Konark Pub. Ltd., Delhi
4. P.Kandasamy, K.Thilagavathy (2003), “Calculus of Finite difference & Numerical Analysis”, S.Chand& Company Ltd., New Delhi-55.

Course Learning Outcomes:

The students after undergoing this course will be able to
CO1: develop the skill of calculation through forward and backward interpolations
CO2: solve by central difference methods
CO3: calculate interpolation for unequal intervals
CO4: solve the solutions of simultaneous equations using different methods.
CO5: understand the concept of initial value problems

Outcome Mapping:

CO / PO	POs				
	1	**2**	**3**	**4**	**5**
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

Signature of the Subject Experts **Signature of the HOD**

YEAR – I	RESOURCE MANAGEMENT TECHNIQUES (FOR B.C.A)	HRS – 5
SEMESTER – II		
PART: III ELECTIVE:II		CREDIT – 4

Course Objective:
The course aims to introduce linear programming, transportation methods, assignment models, sequencing problem, game theory and network analysis in project planning.

UNIT - I :Linear Programming
Definitions of OR - formulations of Linear programming problem - Graphical methods of solution.

UNIT - II :Transportation Models
Definitions of the transportation model - Formulation and solution of transportation models - North-west corner rule - Least cost method - Vogel's approximation method - Solution of transportation - MODI method – unbalanced transportation problem.

UNIT - III :Assignment Models
Definition of Assignment models - Mathematical representation of assignment model- Solution of the assignment models-unbalanced assignment problem.
Sequencing Problem
Sequencing problems – processing 'n' jobs through two machines - processing 'n' jobs through three machines.

UNIT - IV :Game Theory
Introduction – Two person zero sum games – the Maxi mini – Mini max principle – Games without saddle point, Mixed strategies – Matrix Oddment method for nxn games(Arithmetic Model) – Dominance Property.

UNIT - V :Scheduling by PERT and CPM
Introduction - Basic terminologies – Rules for constructing a project network – Network computations - Floats - Programme Evaluation and Review Technique [PERT] – Difference between PERT and CPM.

Text Book:
1. Prof.V.Sundaresan, K.S.Ganapathy Subramanian,K.Ganesan,"Resource Management Techniques"(Operations Research),A.R.Publications,Arpakkam-609111, Reprint June 2002, Tamil Nadu.

   Unit-I: Chapters: 1&2 Pages:1.1,2.1 – 2.32.
   Unit-II: Chapter 7 Pages: 7.1 to 7.62
   Unit-III: Chapters 8 &14 Pages: 8.1-8,22, 14.1-14.6.
   Unit-IV: Chapter 16 Pages: 16.1 – 16.26.
   Unit-V: Chapter 15 Pages: 15.1 to 15.46

Reference Books:

1. Operation Research", Dr.S.J.Venkatesan, [2012], Sri Krishna Publications, Chennai.
2. Taha H. A.[2003], "Operations Research" , Macmillan Publishing Company, New York
3. J.K. Sharma, [2001], "Operations Research Theory and Applications", Macmillan, Delhi

4. P.R. Vittal [2003], "Operations Research" ,Margham Publications, Chennai.

Course Learning Outcomes:

The students after undergoing this course will be able to
CO1: use knowledge of operational research in LPP.
CO2: understand analogies between transportation problem, phenomena in operational Research.
CO3: formulate physical problems as operational research using assignment models
CO4: classify operational research, game theory, interpret the solutions.
CO5: interpret solutions in network analysis.

Outcome Mapping:

CO / PO	POs				
	1	**2**	**3**	**4**	**5**
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

Signature of the Subject Experts **Signature of the HOD**

YEAR – I	SKILL ENHANCEMENT COURSE - 3 INTERNET AND ITS APPLICATIONS (Common Paper)	HRS – 2
SEMESTER – II		
PART: IV		CREDIT – 2

Course Objective:

This subject seeks to develop the would-be Accounting Executives with knowledge in Internet for the application in the area of Accounting.

UNIT– I: Internet Concepts

Introduction – Internet Connection Concepts – Connecting to Dial-up Internet Accounts – High Speed Connections : ISDN, ADSL, and Cable Modes – Intranets : Connecting LAN to the Internet.

UNIT– II: E-Mail Concepts

E-mail Concepts – E-mail Addressing – E-mail Basic Commands – Sending and Receiving Files by e-mail – Controlling e-mail Volume – Sending and Receiving Secure e-mail.

UNIT– III: Internet Services

Online Chatting and Conferencing Concepts – E-mail Mailing Lists – Usenet Newsgroup Concepts – Reading Usenet Newsgroups – Video Conferencing.

UNIT– IV: Web Concepts and Browsers

World-Wide-Web Concepts – Elements of Web – Clients and Servers – URL and TP –Web Browsers – Netscape Navigator and Communicator-Microsoft Internet Explorer.

UNIT– V: Search Engines

Search Engines – Web Directories – Microsoft Internet Explorer – Searching for Information – Bigfoot, Infospace, Whowhere, Yahoo- Subscriptions and Channels – Web Sites-Making use of Web Resources – News and Weather, Sports, Personal Finance and Investing – Entertainment – Shopping – Travel, Kids, Teems, Parents and Communities, Health and Medicine, Religion and Spirituality.

Text Books

1. Alexis Leon and Mathews Leon- Internet for everyone, Leon Techworld, Chennai, India, 2000.
2. Kamlesh N. Agarwal – Business on the Net, McMillan India Ltd., 2002
3. Kamlesh N. Agarwal&PrateekA.Agarwal – Web the Net – An introduction to Wireless application protocal, McMillan India Ltd., 2002
4. Margaret Levine Young-The Complete Reference-Internet", TMG Pub., New Delhi, 2002.

Reference Books

1. Douglas E.Commer-Computer Networks and Internet, PHI (Addition Wesley Lonman), New Delhi, 2001.

2. Minoli Daniel – Internet & Internet Engineering , Tata McGraw Hill, NewDelhi, 2002.

Course Outcomes:

CO1: To understand the concepts of internet for the application in the area accounting
CO2: To understand the concepts of E – Mail
CO3: To learn about the concepts of various internet services.
CO4: To acquire the knowledge about Web Concepts and Browsers
CO5: To know about various Search Engines

Outcome Mapping:

CO / PO	POs				
	1	**2**	**3**	**4**	**5**
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

Signature of the Subject Experts **Signature of the HOD**