



SRI VIDYA MANDIR ARTS & SCIENCE COLLEGE

(Autonomous)

[An Autonomous College Affiliated to Periyar University, Salem, Tamil Nadu]

[Accredited by NAAC with 'A' Grade with CGPA of 3.27]

[Recognized 2(f) & 12(B) Status under UGC Act of 1956]

Katteri – 636 902, Uthangarai (Tk), Krishnagiri (Dt)

Tamil Nadu, India

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DEGREE OF BACHELOR OF SCIENCE IN MATHEMATICS CHOICE BASED CREDIT SYSTEM (CBCS)

REGULATIONS AND SYLLABUS FOR

B.Sc. MATHEMATICS PROGRAMME

(SEMESTER PATTERN)

(For Students Admitted in the College from the Academic Year 2020-2021 Onwards)



Programme Outcomes (POs)

PO1	Communicate Effectively - Well versed in communicating both in English (as medium of instruction) and Tamil (mother's tongue), distinguish between professional and non-professional dialogues. Develop LSRW (Listening, Speaking, Reading, Writing) skills with advanced technologies.
PO2	Environment Concern - Follow RRRR (Reduce, Reuse, Recycle, Refuse) and develop affinity towards environment and practice save Nature and Water.
PO3	Ethical and Healthy Practice - Adhere to values in day to day life, practice yoga and other physical exercises, hence, develop self - respect and self-esteem, have strong integrity.
PO4	Social Consciousness - Understand the rural situations through ERP (Empowering Rural People), and develop social consciousness, solve the issues through interaction, become mediator/ moderator between government and people, and become true citizen of our Nation.
PO5	Subject Specialist - Acquaint their own subject and integrate with other disciplines (CBCS) with advanced technologies and become a Regional, National and Global competitor.



Programme Specific Outcomes (PSOs)

PSO1	Students will develop and apply concepts of expressions, equations and inequalities to investigate and describe.
PSO2	Real Numbers and Algebraic Expressions. Classify and Define Properties of Real Numbers. Solve Multi-Step Linear Equations. Problem Solving.
PSO3	Simplify and perform arithmetic operations on rational algebraic expressions, including those with radicals and perform the basic arithmetic operations of addition, subtraction, multiplication and division on polynomials.
PSO4	Demonstrate an understanding of limits and how they are used in sequences, series, differentiation and integration.
PSO5	The course includes axioms of real number systems, uniform convergence of sequences and series of functions, equi-continuity.
PSO6	Formulate and solve problems as networks and graphs. Develop linear programming (LP) models for shortest path, maximum flow, minimal spanning tree, critical path, minimum cost flow, and transshipment problems. Use CPM and PERT techniques, to plan, Schedule and control project activities.
PSO7	Complex numbers, analytic functions, Cauchy integral theorem, Cauchy integral formula, power series and conformal mapping.
PSO8	Fluid, solid or continuum mechanics. You have good knowledge of a broad range of methods and techniques based on mechanics and can use them for analysis and problem solving.
PSO9	Correlation and Regression analysis, Multiple Regression and Statistical Forecasting.
PSO10	Analyze vector functions to find derivatives, tangent lines, integrals, arc length, and curvature, Differentiate vector fields, Determine gradient vector fields and find potential functions, Evaluate line integrals directly and by the fundamental theorem.
PSO11	To appreciate the basic principles of Boolean algebra, Logic, Set Theory, Permutations.



SRI VIDYA MANDIR ARTS & SCIENCE COLLEGE

(Autonomous)

Bachelor of Science (B.Sc.) in Mathematics

Programme Pattern and Syllabus (CBCS)

(For Students Admitted in the College from the Academic Year 2020-2021 Onwards)

Sl. No.	Part	Nature of Course	Course Code	Name of the Course	Hours/Week	Credits	Marks		
							CIA	ESE	Total
SEMESTER I									
1	I	Language	20UTA1F01	Tamil – I	5	3	25	75	100
2	II	Language	20UEN1F01	English – I	5	3	25	75	100
3	III	Core – I	20UMA1C01	Algebra and Trigonometry	5	4	25	75	100
4		Core –II	20UMA1C02	Logic, sets and Boolean Algebra	6	5	25	75	100
5		Allied – I	20UPH1A01	Allied Physics – I	5	3	25	75	100
6		Allied Practical – I Extended to Semester II	20UPH1AP01	Allied Physics Practical – I	2	Credit and marks are carried to Allied Practical – I of Semester II			
7	IV	Value Education	20UVE101	Yoga	2	2	25	75	100
Total					30	20	150	450	600
SEMESTER II									
8	I	Language	20UTA2F02	Tamil – II	5	3	25	75	100
9	II	Language	20UEN2F02	English – II	5	3	25	75	100
10		Core – III	20UMA2C03	Integral and Vector Calculus	5	5	25	75	100
11		Core – IV	20UMA2C04	Differential Equations	6	5	25	75	100



12	III	Allied – II	20UPH2A02	Allied Physics– II	5	4	25	75	100
13		Allied Practical – I Extended from Semester I	20UPH2AP01	Allied Physics Practical – I	2	3	40	60	100
15		Common Paper	20UES201	Environmental Studies	2	2	25	75	100
Total					30	25	190	510	700
SEMESTER III									
16	I	Language	20UTA3F03	Tamil – III	5	3	25	75	100
17	II	Language	20UEN3F03	English – III	5	3	25	75	100
18		Core – V	20UMA3C05	Real analysis-I	6	5	25	75	100
19		Core – VI	20UMA3C06	Mechanics	5	4	25	75	100
20		Allied – III	20UCH3A01	Allied Chemistry – II	5	4	25	75	100
21	III	Allied Practical– II Extended to Semester IV	20UCH3AP01	Allied Chemistry Practical – II	2	Credit and marks are carried to Allied Practical – II of Semester IV			
23		NMEC-II	20UCS3N01	Non-Major Elective – I	2	2	25	75	100
Total					30	21	150	450	600
SEMESTER IV									
24	I	Language	20UTA4F04	Tamil – IV	5	3	25	75	100
25	II	Language	20UEN4F04	English – IV	5	3	25	75	100
26		Core – VII	20UMA4C07	Real Analysis- II	6	5	25	75	100
		Core – VIII	20UMA4C08	Graph theory	5	5	25	75	100



27	III	Allied – IV	20UCH4A02	Allied Chemistry – II	5	4	25	75	100
29		Allied Practical– II Extended from Semester IV	20UCH4AP01	Allied Chemistry Practical – I	2	3	40	60	100
30	IV	NMEC-II	20UCS4N02	Non-Major Elective – II	2	2	25	75	100
Total					30	25	190	510	700
SEMESTER V									
32	III	Core Course – IX	20UMA5C09	Abstract Algebra	5	5	25	75	100
33		Core Course – X	20UMA5C10	Complex Analysis – 1	6	5	25	75	100
34		Core Course – XI	20UMA5C11	Mathematical Statistics – I	5	5	25	75	100
36		Group A Elective – I		From Group A	5	4	25	75	100
37		Group B Elective – II		From Group B	5	4	25	75	100
38	IV	SBEC – I	20UMA5S01	C- Programming	2	2	25	75	100
39		SBEC – II	20UMA5SP01	C- Programming Practical	2	2	40	60	100
Total					30	27	190	510	700
SEMESTER VI									
40		Core Course – XII	20UMA6C12	Linear Algebra	6	5	25	75	100



41	III	Core Course – XIII	20UMA6C13	Complex Analysis – II	6	5	25	75	100
44		Core Course – XIV	20UMA6C14	Mathematical Statistics – II	6	4	25	75	100
45		Group C Elective – III	20UCS6E03	From Group C	6	4	25	75	100
46	IV	SBEC – III	20UMA6S03	Quantitative Aptitude	4	2	25	75	100
47		SBEC – IV	20UMA6SP02	R Programming (Statistics) Pratical	2	2	40	60	100
				Extension Activity	*	1	*	*	*
Total					30	23	165	435	600
Grand Total					180	140	1035	2865	3900

Note

- CBCS – Choice Based Credit system
 CIA – Continuous Internal Assessment
 ESE – End of Semester Examinations
 SWAYAM – Study Webs of Active-Learning for Young Aspiring Minds
 NPTEL – National Programme on Technology Enhanced Learning



Major Elective Courses

List of Elective Papers (Can Choose Any One for V & VI Semester)				Page
Group A	20UMA5E01	Elective - I	Operations Research	47
	20UMA5E02	Elective - I	Number Theory	50
Group B	20UMA5E03	Elective - II	Numerical Methods	52
	20UMA5E04	Elective - II	Combinatorial Mathematics	55
Group C	20UMA6E05	Elective - III	Astronomy	71
	20UMA6E06	Elective - III	Analytical Geometry of 2-D and 3-D	73

Non-Major Elective Courses

1. Communication English
2. Basic Computer Applications

Skill Based Elective Courses

1. C-Programming
2. C-Programming Practical
3. Quantitative Aptitude

List of Extension Activities

1. National Cade Corps (NCC)
2. National Service Scheme (NSS)
3. Youth Red Cross (YRC)
4. Physical Education (PYE)
5. Eco Club (ECC)
6. Red Ribbon Club (RRC)
7. Women Empowerment Cell (WEC)



PROGRAMME SYLLABUS



Program: B.Sc Mathematics				
Core – I		Course Code:20UMA1C01		Course Title: Algebra and Trigonometry
Semester	Hours/Week	Total Hours	Credits	Total Marks
I	5	75	4	100

Course Objectives

1. In this course students are exposed to topics like Matrices, Theory of equation, Reciprocal equations, Expansions of terms, and Hyperbolic, Inverse hyperbolic.
2. The stress is on the development of problems solving skills.

Unit I:

Matrices: Characteristic equation – Characteristic roots and Characteristic vectors – properties – problems - Cayley – Hamilton theorem (statement only) and its problems – Diagonalisation of Matrices – problems. (Chapter 6, Page: 6.50-6.82).

Unit II:

Theory of equation: Relation between roots and coefficients of equations – Imaginary and irrational roots- Symmetric functions of roots in terms of coefficients of third degree equation – problems. (Chapter 7, Page: 7.1-7.30).

Unit III:

Reciprocal equations: Reciprocal equations- Transformation of equations – Roots with sign changed – Roots multiplied by a given number – problems. Diminishing the roots of an equations– Removal of terms– Descartes' rule of signs–Horner's Method–Newton Method of evaluating a real root correct to given decimal places-problems (Chapter 7, Page:7.30-7.67).

Unit IV:

Expansions of terms: Expansions of $\sin n\theta$, $\cos n\theta$ and $\tan n\theta$ – Expansions of $\sin^n \theta$, $\cos^n \theta$ in terms of multiples angles of θ -Expansions of $\sin \theta$, $\cos \theta$ in ascending power of θ - problems. (Chapter 11, page: 11.1-11.27).

**Unit V:**

Hyperbolic and Inverse hyperbolic function:Hyperbolic Function and its properties – Relation between circular and hyperbolic functions - Inverse hyperbolic function problems (Chapter 11, Page: 11.31-11.56).

Text Book

1. Dr.P.R.Vittal and V.Malini, Algebra Analytical Geometry and Trigonometry, Margham Publications, Chennai – 17,Third Edition 2000.

Reference Books

- 1.T.K.Manicavachagam Pillai, T.Natarajan, K.S.Ganapathy, Algebra Volume I – S.Viswanathan Printers and Publishers Pvt. Ltd., 2004.
- 2.A. Singaravelu and R.Ramaa, Algebra and Trignometry –I,Meenakshi Agency,Chennai, June 2003
- 3.P.Duraipandian, Dr. S.Udayabaskaran, Allied Maths Volume –1, Muhil Publishers Chennai – 28, Reprint 1999.
- 4.S.Narayanan, T.K.Manicavachagam Pillay, Trigonometry,Publisher: Viswanathan , S.,Printers&Publishers Pvt. Ltd., 2004 Edition.

E-Learning Source

<http://www.sosmath.com>



Course Outcomes (COs)

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

CO Number	CO Statement	Knowledge Level
CO1	Study the concept of Matrices and Cayley- Hamilton theorem.	K1
CO2	Finding the solution of Theory of equations.	K2
CO3	Study the concept of Reciprocal Equations	K2& K3
CO4	Evaluate Expansions of $\cos n\theta$ and $\sin n\theta$.	K4&K5
CO5	Obtain the solution of Hyperbolic functions and Inverse hyperbolic functions.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	S
CO2	M	M	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S – Strong

M – Medium

L – Low



Program: B.Sc Mathematics				
Core – II		Course Code:20UMA1C02		Course Title: Logic, Sets and Boolean Algebra
Semester	Hours/Week	Total Hours	Credits	Total Marks
I	6	90	5	100

Course Objectives

1. To extend student's Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems. Gain knowledge about the concept of Mathematical logic and algebraic structures. Know about Boolean algebra and its application to Sequential Machines. Make them to use in practical applications related to computer science.

UNIT I:

Mathematical logic: Connectives: Negation – Conjunction – Disjunction – Statement formulas and Truth table – Conditional and Bi-conditional – Well- formed formulas- Tautologies. (Chapter 1: Sections 1.2.1 to 1.2.4, 1.2.6 to 1.2.8, Page No.: 7-14 & 18-26).

UNIT II:

Mathematical logic (Continued): Normal forms: Disjunctive Normal forms – Conjunctive Normal forms – Principal Disjunctive Normal forms – Principal conjunctive normal forms. (Chapter 1: Sections 1.3.1 to 1.3.4, Page No.: 50-58). The theory of inference for the statement calculus: Validity using truth tables – Rules of inference – Consistency of premises and indirect method of proof. (Chapter 1: Sections 1.4.1 to 1.4.3, Page No.: 65-73).

UNIT III:

Mathematical logic (Continued): The predicate calculus: Predicates – The Statements function, Variables and quantifiers – Predicate formulas – Free and bound variables – The universe of discourse. (Chapter 1: Sections 1.5.1 to 1.5.5, Page No.: 79-89). Inference theory of the predicate calculus: Valid formulas and Equivalences – Some valid formulas over finite



Universes – Special valid formulas involving quantifiers – Theory of inference for the predicate calculus. (Chapter 1: Sections 1.6.1 to 1.6.4, Page No.: 90-99).

UNIT IV:

Set Theory: Relations and ordering: Relations – Properties of binary relation in a set– Functions– Definition and introduction – Composition of functions – inverse functions– Natural numbers– Peano axioms and Mathematical Induction. (Chapter 2: Sections 2.3.1-2.3.2 and 2.4.1-2.4.3 and 2.5.1, Page No.: 148-155, 192-203 and 220-224).

UNIT V:

Lattices and Boolean algebra: Lattices as partially ordered sets: Definition and Examples – Some properties of Lattices– Boolean algebra– Definition and example – Sub algebra, Direct Product and homomorphism – Boolean Functions – Boolean forms and free Boolean algebra – values of Boolean expression and Boolean functions. (Chapter 4: Sections 4.1.1-4.1.2, 4.2.1-4.2.2 and 4.3.2, Page No.: 378-384, 397-403 and 406-416).

Text Book

1. J.P. Trembly, R. Manohar, Discrete Mathematical Structure with Applications to Computer Science, Tata McGraw Hill, 2001.

Reference Books

1. Prof. V. Sundaresan, K. S. Ganapathy Subramaniyan, K. Ganesan, Discrete Mathematics, Tata Mc Graw Hill, New Delhi, 2000.
2. L. Lovarz, J. Pelikan, K. Vexztergombi, Discrete Mathematics, Springer International Edition, 2002.
3. N. Chandrasekaran M. Uma parvathi, Discrete Mathematics, PHI Learning P. Ltd. 2010.
4. Dr. M.K. Sen and Dr. B.C. Charraborthy, Introduction to Discrete Mathematics, Arunabha Sen Books & Allied Pvt. Ltd., 8/1 Chintamoni Das Lane, Kolkata – 700009, Reprinted in 2016.

**E–Learning Sources**

1. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-042j-mathematics-for-computer-science-fall-2005>
2. www.crectirupati.com>default>files
3. www.mafy.lut.fi>Lectures>Lecture2
4. Faculty.atu.edu>mfinan>main2

Course Outcomes (COs)

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

CO Number	CO Statement	Knowledge Level
CO1	Understand Logic and properties.	K1
CO2	Derived Normal forms and The theory of inference for the statement calculus.	K1&K2
CO3	Describe The predicate calculus and Inference theory of the predicate calculus.	K2& K3
CO4	Define and illustrate the Relations and ordering.	K4&K5
CO5	Describe Lattices as partially ordered sets.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	S
CO2	M	M	S	S	S
CO3	M	S	S	S	S
CO4	M	S	S	S	S
CO5	M	S	S	S	S

S – Strong

M – Medium

L – Low



Program: B.Sc Mathematics				
Core – III		Course Code:20UMA2C03		Course Title: Integral and Vector Calculus
Semester	Hours/Week	Total Hours	Credits	Total Marks
II	5	75	5	100

Course Objectives

1. To develop problem solving skills in Calculus and provide base for higher Mathematics and to develop deep understanding of key concepts followed by problems of applied mathematics, which are essential, tools of modern applied mathematics.

UNIT I:

Curvature and Radius of Curvature: Curvature and radius of curvature – Definitions, Cartesian formula for radius curvature, Parametric formula for radius of curvature - Radius of curvature in polar co-ordinates, Radius of curvature for pedal curves, Radius of Curvature for polar tangential curves – problems.(Chapter 6: Page No.: 6.1-6.19, 6.22-6.32).

UNIT II:

Reduction Formula:Bernoulli's formula for integration by parts, Reduction formulae – Problems.(Chapter 11: Page No.: 11.1-11.32).

UNIT III:

Beta, Gamma Functions:Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Evaluations of definite integrals using Beta and Gamma functions – Problems. (Chapter 13: Page No.: 13.1-13.27)

UNIT IV:

Vector Integration: Vector integration – Line integral – Application of line integral-Surface and Volume integrals – Problems. (Chapter 2: Page No.: 59-89).

**UNIT V:**

Vector Integration (Continuation): Gauss Divergence theorem -Stoke's theorem – Green's theorem in plane– Problems. (Chapter 2: Page No.: 89-106, 108-126, 129-140).

Text Books

1. P.R. Vittal and V. Malini, Calculus, Margham Publications, Chennai, 2012 (for UNIT I, II, III).
2. P.R. Vittal and V. Malini, Vector Analysis, Margham Publications, Chennai, 2006 (for UNIT IV, V).

Reference Books

1. S.Narayanan, T.K.Manicavachagam Pillay, Trigonometry, Publisher: Viswanathan , S.,Printers&Publishers Pvt. Ltd, 2004
- 2.T.K.Manicavasagam Pillai, Natarajan and Ganapathy, Algebra Vol.1 Publisher: Viswanathan , S.,Printers&Publishers Pvt. Ltd, 2004
3. P. Duraipandian, Laxmi Duraipandian, Vector Analysis, Emerald Publishers, Chennai, Reprint 2003.

E-learning Sources

1. <https://online.math.uh.edu/HoustonACT/videocalculus/>
2. [http://www.math.hmoedu/calculus/tutorials/vector analysis/](http://www.math.hmoedu/calculus/tutorials/vector%20analysis/)



Course Outcomes (COs)

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

CO Number	CO Statement	Knowledge Level
CO1	Find the Curvature and radius of curvature in polar coordinates.	K1
CO2	Solving technique of integrals, Integration by parts and Bernoulli's formula.	K2
CO3	Discuss Beta & Gamma functions.	K2& K3
CO4	Define a vector differentiation, Find and interpret of vector differential operator, Gradient, Direction and magnitude of gradient.	K4
CO5	Evaluate Gauss divergence theorem, Stoke's theorem and Green's theorem.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	S
CO2	M	M	S	S	S
CO3	M	S	S	S	S
CO4	M	S	S	M	S
CO5	S	S	M	S	S

S – Strong

M – Medium

L – Low



Program: B.Sc Mathematics				
Core – IV		Course Code:20UMA2C04		Course Title: Differential Equations
Semester	Hours/Week	Total Hours	Credits	Total Marks
II	6	90	5	100

Course Objectives

1. To help the learners to solve standard types of ordinary and partial differential equations.
2. Know about Laplace transforms and its application of differential equations.

UNIT I:

Equations of the First Order and of the First Degree: Equations of the First Order – Variables Separable – Homogeneous and Non-Homogeneous Equations of the first Degree in x and y – Exact Differential Equations– Integrating factor – Problems only. (Chapter- 2, Section 2.1 to 2.8, Page: 2.1 to 2.74).

UNIT II:

Linear Equations of the Second Order with variable coefficients and Total Differential Equations: Second order differential Equations with variable co-efficient – Method of variation of parameters – simple problems – Total differential equations - Problems. (Chapter-7, Section 7.1 to 7.11, Page : 7.1 to 7.50)and (Chapter-8, Section 8.1 to 8.5, Page: 8.1 to 8.22).

UNIT III:

Partial Differential Equations: Formation of equation by eliminating arbitrary constants and arbitrary functions – Types of Solution of P.D.E – Solutions of first order P.D.E in the standard forms – Lagrange's Linear equation $Pp + Qq = R$ – Solution of the simultaneous Equations. (Chapter-9: Section :9.1 to 9.8, Page :9.1 to 9.62).

UNIT IV:



Laplace Transforms: Laplace Transforms – Definition – Properties of Laplace transforms– Periodic functions – Laplace transforms of elementary functions – Problems. (Chapter:7 Section :1 to 3, Page :7.1 to 7.23).

UNIT V:

Inverse Laplace transforms: Inverse Laplace transforms – Standard formulae – Elementary Theorems – Solving differential Equation using Laplace transforms and Solving Simultaneous linear differential equations. (Chapter: I Section:1.7 to 1.15, Page :1.21 to 1.56 and Section:1.18 to 1.2, Page :1.65 to 1.88).

Text Books

1. Dr. M.K. Venkatraman, Mrs. Manorama Sridhar, Differential Equations and Laplace Transforms, The National Publishing Company, 2010. (UNIT-I, II, III, V).
2. P.R. Vittal [2004], Differential Equations and Laplace Transform, Margham Publications, Chennai, (UNIT-IV).

Reference Books

1. S. Narayanan, Differential Equations and Laplace Transformations, Vijay Nicole Imprints Pvt. Ltd., C – 7, Nelson Chambers, 115 Nelson Manickam Road, Chennai – 600 029, 2004.
2. K. Sankar Rao - Introduction to Partial Differential Equations Prentice Hall India – New Delhi, 1997.
3. Dr. J.K. Goyal and K.P. Gupta, Laplace and Fourier Transforms, Pragati Prakashan Publishers, Meerut, 2000.



Course Outcomes (COs)

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

CO Number	CO Statement	Knowledge Level
CO1	Solve the first order differential equations through various techniques.	K1
CO2	Learn the methods for solving Linear Differential Equations with constant and variable coefficients.	K2
CO3	Evaluate the partial differential equations of first order using different methods.	K3
CO4	Understand the basic concepts of Laplace and Inverse Laplace Transforms.	K4
CO5	Apply Laplace and Inverse Laplace transforms to solve the ordinary differential equations.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create

Mapping of COs with POs

PO \ CO	PO1	PO2	PO3	PO4	PO5
CO1	M	M	M	S	S
CO2	M	M	S	S	M
CO3	S	S	M	S	S
CO4	S	S	S	S	S
CO5	M	S	S	S	S

S – Strong

M – Medium

L – Low



Program: B.Sc Mathematics				
Allied Mathematics B.Sc.PHY/CHE/CS/BCA		Course Code:20UMA1A01		Course Title: Allied Mathematics – I
Semester	Hours/Week	Total Hours	Credits	Total Marks
I	6	90	5	100

Course Objectives

1. To acquire knowledge about the rank of a matrix, characteristic roots and characteristic vectors.
2. To gain knowledge about the various concepts on matrices.
3. Promote problem solving ability in differential equations.

UNIT I: MATRICES

Definition of characteristics Equation of a matrix – characteristics roots of a matrix–Eigen values and the corresponding Eigen vectors of matrix–cayley Hamilton theorem (statement only)–Verification of Cayley Hamilton theorem –problems. (Chapter 5 , Pages: 5.50-5.73).

UNIT II: FINITE DIFFERENCES

Finite differences– Newton’s forward and backward formula for interpolation – Lagrange’s formula – Interpolation of missing values. (Chapter 7, Pages: 7.1-7.29).

UNIT III: RADIUS OF CURVATURE

Formula of radius of curvature in Cartesian coordinates-parametric coordinates and polar coordinates(no proof for formulae)–problems only.(Chapter 11Pages: 11.1-11.19 & 11.22-11.33).

UNIT IV: ORDINARY DIFFERENTIAL EQUATIONS

Ordinary Differential Equation–second order differential equation with constant coefficient–Particular integrals of the form $e^{ax}v$, where v is of the form x , $x^2 \cdot \sin ax, \cos ax$. (Chapter 23,Pages:23.1-23.28).

UNIT V: PARTIAL DIFFERENTIAL EQUATIONS

Formation of partial differential equations by eliminating arbitrary constants and arbitrary functions–Lagrange’s linear partial differential equations $Pp+Qq=R$ -problems only.(Chapter 26, Pages:26.1-26.14 & 26.44-26.56).

**Text Book**

1. Dr.P.R.Vittal, Allied Mathematics, Margham Publications, Chennai-17, Reprint 2012.

Reference Books

- 1.S.G.Venkatachalapathi, Allied Mathematics, Margham Publications, Chennai-17, Reprint 2011.
2. P.R.Vittal, V. Maline, Calculus, Margham Publications, Chennai-17, Reprint 2012.
3. P.Duraipandian, Dr. S.Udayabaskaran, Allied Maths, Volume –1, Muhil Publishers Chennai- 28, Reprint 1999.

Course Outcomes (COs)

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

CO Number	CO Statement	Knowledge Level
CO1	Acquire knowledge about the rank of a matrix, characteristic roots and characteristic vectors.	K1
CO2	Solve algebraic and transcendental equations by Numerical methods.	K2
CO3	Solve the problem of radius of curvature in Cartesian coordinates, parametric coordinates and polar coordinates	K3 & K4
CO4	recall the concepts of second order differential equations and acquire knowledge to find the particular integral for different types of functions.	K4 & K5
CO5	Analyse the different types of solutions for partial differential equations.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create



Mapping of COs with POs

PO CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	M	S	S	S	S
CO3	M	S	M	S	S
CO4	M	S	S	S	S
CO5	S	S	S	S	S

S – Strong

M – Medium

L – Low



Program: B.Sc Mathematics				
Allied Mathematics B.Sc.PHY/CHE/CS/BCA		Course Code:20UMA2A02		Course Title: Allied Mathematics – II
Semester	Hours/Week	Total Hours	Credits	Total Marks
II	6	90	5	100

Course Objectives

1. To acquire knowledge about the Integral calculus and Laplace transform.
2. Understand the method of doing problems using the above concepts.
3. Acquire knowledge in theory of equations
4. Acquire the knowledge in vector differentiation.

UNIT I: DEFINITE INTEGRAL

Definite integrals Simple properties of definite integrals–Bernoulli’s formula –Integration by

parts-Simple problems-Reduction formula for $\int_0^{\frac{\pi}{2}} \sin^n x dx$, $\int_0^{\frac{\pi}{2}} \cos^n x dx$, $\int_0^{\infty} e^{-x} x^n dx$ -simple

problems.(Chapter 15& 16 , Pages 15.54-15.75& 16.1-16.9).

UNIT II: THEORY OF EQUATIONS

Imaginary and irrational roots– Reciprocal equation – diminish the root of equations – Removal of terms – Descartes’ rule of signs. (Chapter 6, pages: 6.19-6.25, 6.30-6.37,6.49-6.60).

UNIT III:LAPLACE AND INVERSE LAPLACE TRANSFORMS

Laplace Transforms–Definition-laplace transform of standard functions–Elementary theorems–problems–Inverse Laplace Transforms–Standard formula– problems.(Chapter 27, Pages:27.1-27.19, 27.23-27.38).

UNIT IV: VECTOR DIFFERENTIATION

Vector Differentiation–Limit of a vector function–Continuity and derivative of vector function– Gradient–Directional Derivative of Scalar Point Functions–Equation of Tangent Plane and Normal Line to a level surface–Problems only.(Chapter 28, Pages: 1-20).



UNIT V: VECTOR DIFFERENTIATION(Continuation)

Vector Point Function: Divergence and Curl of a vector point function –Solenoidal and irrotational functions– vector identities–Laplacian operator.(Chapter 28, Page no. 22-33, 35-50).

Text Book

1. Dr.P.R.Vittal,Allied Mathematics,Margham Publications,Chennai-17,Reprint 2012.

Reference Books

- 1.S.G.Venkatachalapathi,Allied Mathematics,Margham Publications,Chennai-17,Reprint 2011.
2. Vector Analysis, Dr.P.R.Vittal, Margham Publications,Chennai-17,Reprint 2006.
3. Vector Analysis, P.Duraipandian and Laxmi Duraipandian,Emerald Publishers, Reprint 2003.

Course Outcomes (COs)

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

CO Number	CO Statement	Knowledge Level
CO1	Grasp the concept of multiple integrals and its evaluations.	K1
CO2	Understand the relation between the roots and coefficients,symmetric functions of the roots, reciprocal equation and solve the related problems.	K2
CO3	Learn the Laplace and Inverse Laplace transform of elementary functions and study its applications.	K3& K4
CO4	To solve Vector Differentiation, Limit of a vector function, Continuity and derivative of vector function.	K5
CO5	Analyse the different types of Vector Point Function.	K5

K1 – Remember, K2 – Understand, K3 – Apply, K4 – Analyze, K5 – Evaluate, K6 – Create



Mapping of COs with POs

PO CO	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	M	S	S	S	S
CO3	M	S	M	S	S
CO4	M	S	S	S	S
CO5	S	S	S	S	S

S – Strong

M – Medium

L – Low