

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

(Affiliated to Bharathidasan University)

(Accredited by NAAC; An ISO 9001:2015 Certified Institution)

SUNDARAKKOTTAI, MANNARGUDI – 614016.

TAMILNADU, INDIA.



B.Sc., MATHEMATICS COURSE STRUCTURE UNDER CBCS

(For the candidates admitted in the academic year 2022–2023)

ELIGIBILITY: A Pass in 10+2 with Mathematics as one of the core subject

Sem	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hours/Week	Credit	Exam Hours	Marks		Total	
								CIA	ESE		
I	I	Language Course (LC)-I-Tamil*/Other Languages ** #	22LC101	Ikkala Ilakkiyam	6	3	3	25	75	100	
	II	English Language Course (ELC) – I	21ELC101	Language through Literature I (Prose and Communication Skills)	6	3	3	25	75	100	
	III	Core Course (CC)– I		22MA101	Differential Calculus and Trigonometry	5	4	3	25	75	100
		Core Course (CC) – II		22MA102	Integral Calculus	4	4	3	25	75	100
		First Allied Course (AC) – I		22APY101	Allied Physics – I	4	3	3	25	75	100
		First Allied Course (AP) – I		22APY102P	Allied Physics Practical – I	3	2	3	40	60	100
	IV	Value Education	22UGVED	Value Education	2	2	3	25	75	100	
TOTAL					30	21				700	
II	I	Language Course (LC) – II-Tamil*/Other Languages** #	22LC201	Idaikkala Ilakkiyamum Pudhinamum	6	3	3	25	75	100	
	II	English Language Course (ELC) - II	21ELC201	Language through Literature II (Poetry and Communication Skills)	6	3	3	25	75	100	
	III	Core Course (CC) – III		22MA203	Probability & Statistics	5	4	3	25	75	100
		Core Course (CC) – IV		22MA204	Analytical Geometry 3D	4	4	3	25	75	100
		First Allied Course (AC)– II		22APY203	Allied Physics – II	4	3	3	25	75	100
		First Allied Course (AP) – II		22APY204P	Allied Physics Practical – II	3	2	3	40	60	100
	IV	Environmental Studies	22UGCES	Environmental Studies	2	2	3	25	75	100	
TOTAL					30	21				700	
III	I	Language Course (LC) -III Tamil*/Other Languages ** #	22LC301	Kaapiyamum Naadakamum	6	3	3	25	75	100	
	II	English Language Course (ELC) – III	22ELC301	Language through Literature III (Drama and Communication Skills)	6	3	3	25	75	100	
	III	Core Course (CC) – V		23MA305	Sequences and Series	4	4	3	25	75	100
		Core Course (CC) – VI		23MA306	Classical Algebra and Theory of Numbers	5	4	3	25	75	100
		Second Allied Course (AC) – I		23ACS301	Introduction to Computer & Office Automation	4	4	3	25	75	100
		Second Allied Course (AP) – I		23ACS302P	Office Automation Lab	3	2	3	40	60	100
	IV	Non Major Elective - I			2	2	3	25	75	100	
TOTAL					30	22				700	

Sem	Part	Nature of the Course	Course Code	Title of the Course	Inst. Hours/Week	Credit	Exam Hours	Marks		Total	
								CIA	ESE		
IV	I	Language Course (LC) -IV - Tamil*/Other Languages **#	22LC401	Sanga Ilakkiyam	6	3	3	25	75	100	
	II	English Language Course(ELC) –IV	22ELC401	Language through Literature IV (Short Stories and Communication Skills)	6	3	3	25	75	100	
	III	Core Course (CC) – VI I		23MA407	Differential Equations and Laplace Transforms	4	4	3	25	75	100
		Core Course (CC) – VIII		23MA408	Vector Calculus and Fourier Series	4	4	3	25	75	100
		Second Allied Course (AC) – II		23ACS403	Fundamentals of C Programming	3	2	3	25	75	100
		Second Allied Course (AP) – II		23ACS404P	Computer Programming lab using C	3	2	3	40	60	100
	IV	Non Major Elective II				2	2	3	25	75	100
		Skill Based Elective – I				2	2	3	25	75	100
	TOTAL					30	22				800
V	III	Core Course (CC)– IX	R23MA509	Algebra-I	6	5	3	25	75	100	
		Core Course (CC) – X	R23MA510	Real Analysis	6	5	3	25	75	100	
		Core Course (CC) – XI	R23MA511	Numerical Methods with MATLAB Programming	5	4	3	25	75	100	
		Core Practical (CP) – I	R23MA512P	Numerical Methods with MATLAB Programming(P)	2	2	3	40	60	100	
		Major Based Elective – I	R23MBEMA1:1/ R23MBEMA1:2	Operations Research/Mathematical Modelling	5	5	3	25	75	100	
	IV	Skill Based Elective – II				2	2	3	25	75	100
		Skill Based Elective – III				2	2	3	25	75	100
		Soft Skill Development		23UGSDC		2	2	3	25	75	100
	TOTAL					30	27				800
VI	III	Core Course (CC) – XII	R23MA613	Algebra-II	6	4	3	25	75	100	
		Core Course (CC) – XIII	R23MA614	Complex Analysis	6	5	3	25	75	100	
		Core Course (CC) – XIV	R23MA615	Mechanics	6	5	3	25	75	100	
		Major Based Elective – II	R23MBEMA2:1/ R23MBEMA2:2	Graph Theory/Discrete Mathematics	5	5	3	25	75	100	
		Core Course (CC) – XV	R23MAPW	Project	6	6	-	-	-	100	
	V	Gender Studies		23UGGS		1	1	3	25	75	100
		Extension Activities				-	1	-	-	-	-
		SWAYAM (EXTRA)					4*				
TOTAL					30	27				600	
GRAND TOTAL					180	140				4300	

CURRICULUM DESIGN

LIST OF ALLIED COURSES

ALLIED COURSE I - PHYSICS

ALLIED COURSE II - COMPUTER SCIENCE

Subject	No. of Courses	Total Credits
Language Part – I	4	12
English Part –II	4	12
Core Course	14	60
Core Practical	1	02
Allied Course	4	12
Allied Practical	4	08
Non-Major Elective	2	04
Skill Based Elective	3	06
Major Based Elective	2	10
Project	1	06
Environmental Studies	1	02
Value Education	1	02
Soft Skill Development	1	02
Gender Studies	1	01
Extension Activities	-	01 (Credit only)
Total	43	140

* For those who studied Tamil upto 10th +2 (Regular Stream);

+ Syllabus for other Languages should be on par with Tamil at degree level;

those who studied Tamil upto 10th +2 but opt for other languages in degree level under Part I should study special Tamil in Part IV;

** Extension Activities shall be outside instruction hours.

Note:

	CIA	ESE
1. Theory	25	75
2. Practical	40	60
3. Separate passing minimum is prescribed for CIA and ESE		

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for ESE shall be 40% out of 75 marks[i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for ESE shall be 40% out of 60 marks [i.e. 24 marks]

NON MAJOR ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course	Course Code	Title of the Paper
III	IV	NME - I	23NMEMA31	Busines Mathematics I
IV	IV	NME -II	23NMEMA42	Business Mathematics II

SKILL BASED ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course	Course Code	Title of the Paper
IV	IV	SBE-I	23SBEMA1	Quantitative Aptitude-I
V	IV	SBE-II	R23SBEMA2	Quantitative Aptitude-II
V		SBE-III	R23SBEMA3	Quantitative Aptitude-III

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

(For the candidates admitted in the academic year 2021–2022)

Question Paper Pattern- (Theory)

Max time: 3 Hours

Max Marks: 75

Section – A (10 x 2 = 20)

Answer all the questions

Answer in One or Two sentences each

- | | |
|-------|----------|
| 1. } | |
| 2. } | Unit I |
| 3. } | |
| 4. } | Unit II |
| 5. } | |
| 6. } | Unit III |
| 7. } | |
| 8. } | Unit IV |
| 9. } | |
| 10. } | Unit V |

Section – B (5 x 5 = 25)

Answer all the questions

Each answer should not exceed 500 words

- | | |
|--------------|----------|
| 11. a (or) } | |
| b } | Unit I |
| 12. a (or) } | |
| b } | Unit II |
| 13. a (or) } | |
| b } | Unit III |
| 14. a (or) } | |
| b } | Unit IV |
| 15. a (or) } | |
| b } | Unit V |

Section – C (3 x 10 = 30)

Answer any THREE questions in 1200 words

- | | |
|------|----------|
| 16 . | Unit I |
| 17 . | Unit II |
| 18 . | Unit III |
| 19 . | Unit IV |
| 20 . | Unit V |

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DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: III-CC-V: Sequences and Series

Ins. Hrs./Week: 4

Course Credit: 4

Course Code: 23MA305

UNIT-I: Sequences (13 Hours)

Introduction - Sequences – Bounded Sequences – Monotonic Sequences – Convergent Sequences – Divergent Sequences – Oscillating sequences – Definitions with Examples - Theorems - Problems.

UNIT-II: Algebra of Limits and Monotonic functions (12 Hours)

The Algebra of limits - Theorems for sequences which are calculating limits of sequences – Problems – Behaviour of monotonic sequences – Theorems and Problems.

UNIT-III: Theorems on limits and Sub sequences (13 Hours)

Cauchy's first limit theorem – Cesaro's theorem - Cauchy's second limit theorem – Some theorems on limits – Subsequences – Peak point – Definition with examples – Theorems and Problems.

UNIT-IV: Series of Positive terms and Comparison Test (11 Hours)

Series – Infinite series – Definition with examples - Cauchy's general principle of convergence – Problems - Comparison Test - Test of convergence using Comparison test (Comparison test statement only, no proof).

UNIT-V: Series of Arbitrary Terms (11 Hours)

Test of convergence using D'Alembert's ratio test - Test of convergence using Cauchy's Root test – Problems - Alternating Series – Test of convergence using Leibnitz's test – Absolute Convergence (Statement only for all Tests)

Total Lecture Hours - 60

COURSE OUTCOME

The students will be able to

1. Understand the definitions of limits and convergence in the context of sequences and series of real numbers.
2. Knowledge of some simple techniques for testing the convergence of sequences and series.
3. Familiarity with a variety of well-known sequences and series, with a developing intuition about the behaviour of new ones.
4. Compute limits of sequences involving elementary functions.
5. Prove simple statements involving convergence arguments.

TEXT BOOKS

1. Arumugam, S and Thangapandi Isaac. A, 2002. Sequences and Series, New Gamma Publishing House, Palayamkottai.

- UNIT I Chapter 3 : Sec. 3.0 to 3.5
UNIT II Chapter 3 : Sec. 3.6, 3.7
UNIT III Chapter 3 : Sec. 3.8 ,3.9
UNIT IV Chapter 4 : Sec. 4.1 , 4.2
UNIT V Relevant part of Chapter 4 and Chapter 5 : Sec. 5.1 & 5.2

REFERENCE BOOK(S)

1. Arumugam, S, Thangapandi Isaac, A and Somasundaram, S. 2019. Sequences and Series, Yes Dee Publishing Pvt. Ltd., Chennai.
2. Francis Raj, M.I. 2004. Algebra. Margham publications, Chennai.
3. Manicavachagom Pillay, T.K, Natarajan.T, and Ganapathy.K.S, 2007. Algebra Volume I, Viswanathan .S Pvt. Ltd., Chennai.
4. Surya Narayan Iyer.S, 2002. Algebra, Margham Publications, Chennai.

E-RESOURCES

1. <https://sites.math.northwestern.edu/~mlerma/courses/b17-99f/seq.pdf>
2. https://booksite.elsevier.com/9780123846549/Chap_Series
3. <https://www.math.ksu.edu/~vlnewberry/Seriesandsequences.pdf>
4. <https://www.esaral.com/sequence-and-series-class-11-notes/#>
5. <https://ms.mcmaster.ca/~ppoudel/Teaching/Spring%2015/Homework/Summary%20-%20Series%20and%20Sequences.pdf>

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: III-CC-VI: Classical Algebra and Theory of Numbers

Ins. Hrs./Week: 5

Course Credit: 4

Course Code: 23MA306

UNIT- I: Theory of Equations (16 Hours)

Introduction of Polynomials - In an equation with real coefficients, imaginary roots occur in pairs - In an equation with rational coefficients, irrational roots occur in pairs –Relation between roots & coefficients of Equations.

UNIT- II: Theory of Equations Continued (15 Hours)

Symmetric functions of the roots – Sum of the Powers of the Roots of an equation - Newton's theorem on the sum of the powers of the roots.

UNIT – III: Theory of Equations Continued (15 Hours)

Transformations of Equations – Roots with signs changed – Roots multiplied by a given number – Reciprocal roots – Diminishing, Increasing & Multiplying the roots by a constant - Reciprocal equations – Standard form of reciprocal equations – A reciprocal equation of the standard form can always be depressed to another of half the dimensions - To increase or decrease the roots of the equation by a given quantity.

UNIT – IV: Theory of Equations Continued (15 Hours)

Form of the quotient and remainder – Removal of terms – To form an equation whose roots are any power – Transformation in general – Descartes rule of signs - Descartes rule of signs for Positive roots - Descartes rule of signs for negative roots.

UNIT – V: Theory of Numbers (14 Hours)

Theory of Numbers – Prime & Composite numbers – Divisors of a given number N – Euler's Function $\phi(N)$ and its value – The highest power of a prime P contained in $n!$ – Congruences – Fermat's, Wilson's & Lagrange's Theorems and using in solved Problems.

Total Lecture Hours- 75

COURSE OUTCOME

The students will be able to

1. Learn the relation between the roots and coefficients of the polynomial equation.
2. Understand the Sum of the Powers of the Roots of an equation.
3. Learn the transformation of equations.
4. Understand the concept of Descartes rule of sign.
5. Demonstrate knowledge and understanding of prime numbers, congruences.

TEXT BOOKS

1. T.K.Manickavasagam Pillai & T.Natarajan, K.S.Ganapathy, 2007. Algebra Volume I S.Viswanathan (Printers & Publishers) PVT. LTD.
2. T.K. Manickavasagam Pillai & others , 2014. Algebra Volume II, 1985 Revised Edition. S.V.Publications.

- UNIT - I Chapter 6 : Sec. 9, 10 & 11 of 1)
UNIT - II Chapter 6 : Sec. 12, 13 & 14 of (1)
UNIT - III Chapter 6 : Sec. 15,16 & 17 of (1)
UNIT - IV Chapter 6 : Sec. 18,19, 20,21 & 24 of (1)
UNIT - V Chapter 5 : Sec. 1 to 17 of (2)

REFERENCE BOOK(S)

1. Arumugam S and Thangapandi Isaac A, 2012. Modern Algebra, SciTech Publications (India) Pvt. Ltd., Chennai.
2. Hall. H. S and Knight S.R. 2005. Higher Algebra, Prentice Hall of India, New Delhi.
3. Hall H.S. and Knight. S.R 1948. Higher Algebra, McMillan and Co., London.
4. John, B. Fraleigh, 1999. A First Course in Abstract Algebra, Fifth Edition, Addison-Wesley Publishing company.
5. Roger Cooke, 2008. Classical Algebra - Its Nature, Origins, And Uses, A John Wiley & Sons, Inc., Publication.

E_RESOURCES

1. <https://Download.E-Bookshelf.De/Download/0000/5710/63/L-G-0000571063-0002357534.Pdf>
2. <https://Www.Maths.Ed.Ac.Uk/~V1ranick/Papers/Borevich.Pd>
3. https://Kkhsou.Ac.In/Eslm/Eslm_Main/1st%20sem/Bachelor%20degree/Mathematics/Block%20i/Book.Pdf
4. <Http://Www.Freebookcentre.Net/Maths-Books-Download/Topics-In-Classical-Algebraic-Geometry-Pdf.Html>
5. https://www.buecher.de/shop/sonstige-themen/classical-algebra-ebook-pdf/cooke-roger-l/products_products/detail/prodid/37291551/

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DEPARTMENT OF MATHEMATICS
NON MAJOR ELECTIVES

Semester: III- NME - I : Business Mathematics - I

Ins. Hrs./Week: 2

Course Credit: 2

Course Code: 23NMEMA31

UNIT – I: Logical Statement and Truth Table (6 Hours)

Logical statement - Truth Tables- Negation - Compounding - Negation of Compound Statements - Tautologies and Fallacies - Propositions - Algebra of Propositions - Conditional Statements - Biconditional Statements – Arguments – Joint Denial.

UNIT – II: Theory of Sets (6 Hours)

A Set - Elements of a set - Methods of Describing a Set - Types of Sets - Venn diagrams - Operations on sets - Intersection and Union of Sets - Complement of a set - De- Morgan's Law - Difference of two sets - Symmetric Difference - Algebra of Sets – Duality – Partition of a set – Regrouping of the Sets – Number of Elements in a Finite Set.

UNIT - III: Logarithms (6 Hours)

Introduction - Laws of Operations - Logarithmic Tables - Operations with Logarithms – Compound Interest – Depreciation – Annuities.

UNIT-IV: Permutations and Combinations (6 Hours)

Fundamental rule of counting – Permutations – Factorial Notation – Permutation of n Different Things – Circular Permutations – Permutations of Things not all Different – Restricted Permutations – Combinations – Complementary Theorems – Restricted Combinations - Combinations of Things not all Different.

UNIT – V: Arithmetic and Geometric Progression (6 Hours)

Arithmetic Progression - Sum of a series in A.P - Arithmetic Mean - Geometric Progression - Sum of a series in G.P - Geometric Mean.

Total Lecture Hours- 30

COURSE OUTCOME

The students will be able to

1. Understand the concept of logical statement, truth table, negation, negation of compound statements, arguments and joint denial.
2. Extrapolate the sets, algebra of Sets and its properties.
3. Develop the knowledge of calculations with logarithms in case of compound interest.
4. To improve the concepts of permutations and combination and its difference.
5. Derive the arithmetic and geometric progression and its applications in solving problems.

TEXT BOOKS

1. Sancheti.D.C and Kapoor.V.K, 2017. Business Mathematics, Revised Edition. Sultan Chand & Sons, Educational Publishers, New Delhi.

UNIT I Chapter 1 : Sec. 1.1 to 1.12

UNIT II Chapter 2 : Sec. 2.1 to 2.17

UNIT III Chapter 7 : Sec. 7.1 to 7.6

UNIT IV Chapter 9 : Sec. 9.1 to 9.11
UNIT V Chapter 12 : Sec. 12.1 to 12.6

REFERENCE BOOK(S)

1. Gupta, Saxena Dr.Sinha, 2019. Business Mathematics, SBPD Publications.
2. Mariappan.P, 2015. Business Mathematics, Pearson India Education Services Pvt. Limited.
3. Rayarikar.A.V and Dixit.P.G, 2019. Business Mathematics, Nirali prakashan advancement of knowledge.
4. Shuka.S.M, 2019. Business Mathematics, Sahitya Bhawan Publications, Revised.
5. Vittal.P.R, 2018. Mathematics Foundation, Re-Edition, Margham Publications.

E_RESOURCES

1. https://www.whitman.edu/mathematics/higher_math_/section01.01.html
2. https://www.researchgate.net/publication/297319798_Set_theory
3. https://www.researchgate.net/publication/50315356_APPLICATION_OF_THE_PRINCIPLES_OF_PERMUTATION_AND_COMBINATION_IN_MATHEMATICS_IN_TELECOMMUNICATIONS
4. <https://www.onlinemathlearning.com/geometric-sequences-nth-term.html>
5. <https://www.toppr.com/ask/content/concept/arithmetic-geometric-progressions-207710/>

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: IV-CC- VII: Differential Equations and Laplace Transforms

Ins. Hrs./Week: 4

Course Credit: 4

Course Code: 23MA407

UNIT-I: Differential Equations of the First Order (13 Hours)

Equations of the first order, higher degree differential equations solvable for dy/dx - Equations solvable for y - Equations solvable for x – Clairaut's Form – Conditions of Integrability of $M dx + N dy = 0$ - Exact Differential Equation – Solved problems.

UNIT –II: Linear Differential Equations with Constant coefficients (13 Hours)

Linear differential equations with constant coefficients– Particular Integral– Finding Particular integrals in the cases of e^{kx} , $\sin(kx)$, $\cos(kx)$ (where k is a constant), x^k (where k is a positive integer) and $e^{kx}f(x)$ (where $f(x)$ is any function of x) – Solved problems.

UNIT–III:First Order Partial Differential Equations (12 Hours)

Formation of Partial Differential Equations by eliminating constants-Formation of Partial Differential Equations by eliminating arbitrary functions–Definition of general, particular & Complete solutions–Singular integral-Solutions by Direct Integration– First order Partial Differential Equations –Type – I : $f(p, q) = 0$, Type – II: $F(x, p, q) = 0$, $F(y, p, q) = 0$, $F(z, p, q) = 0$, Type – III: $f_1(x, p) = f_2(y, q)$ and Type – IV: $z = px + qy + f(p, q)$ - Solved Problems.

UNIT-IV:Laplace Transforms (12 Hours)

Introduction to Laplace Transforms – Definition-Sufficient Conditions-Laplace Transform of Periodic Functions - Solved Problems.

UNIT-V: Inverse Laplace Transforms (10 Hours)

Definition - Solution of Ordinary Differential Equations with constant coefficients Using Laplace Transforms- Some general Theorems - Solved Problems.

Self-study report on application of pure and applied mathematics in real life

Total Lecture Hours-60

COURSE OUTCOME

The students should be able to

1. Compute the order and degree of the Ordinary Differential Equations.
2. Identify some specific methods to solve Differential Equations.
3. Formulate Partial Differential Equations by eliminating constants and arbitrary functions.
4. Analyze the basic properties of Laplace transforms.
5. Apply the Inverse Laplace Transforms.

TEXT BOOK(S)

1. Narayanan. S and Manicavachagom Pillay T. K. 2014. Calculus Volume – III. S. Viswanathan Pvt. Ltd., Chennai.

UNIT-I	Chapter 1	: Sec 3.1 to 3.3, 5 and 6
UNIT-II	Chapter 2	: Sec 1 to 4
UNIT-III	Chapter 4	: Sec 2.1 to 2.2, 3, 5 (5.1 – 5.4)
UNIT –IV	Chapter 5	: Sec 1 to 4
UNIT– V	Chapter 5	: Sec 6 to 8

REFERENCEBOOK(S)

1. Braun. M. 1975. Differential Equations and their Applications. Springer Science, Business Media LLC, London.
2. Kapoor. N.M. 2006. A Text Book of Differential Equations.Pitambar Publishing Company Pvt. Ltd., New Delhi.
3. Khanna. M.L. 1994. Differential Equation.JaiPrakashNath Publications, Meerut.
4. Raisinghania. M.D. 2013. Ordinary and Partial Differential Equations.S.Chand and Co. Ltd., New Delhi.
5. Murray R. Spiegel, “Theory and Problems of Laplace Transforms, McGraw Hill Book Co.

E-RESOURCES

1. <https://www.math.ust.hk/~machas/differential-equations.pdf>
2. http://mdudde.net/pdf/study_material_DDE/M.Sc.MAthematics/DIFFERENTIAL%EQ_UATIONS.pdf
3. https://www.researchgate.net/publication/267487772_Differential_Equations_and_Thier_Applications
4. <http://www.math.toronto.edu/selick/B44.pdf>
5. https://www.researchgate.net/publication/332863667_PROBLEMS_SET_DIFFERENTIAL_EQUATION

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DEPARTMENT OF MATHEMATICS
B.Sc., MATHEMATICS

Semester: IV-CC-VIII: Vector calculus and Fourier Series

Ins. Hrs./Week: 4

Course Credit: 4

Course Code: 23MA408

UNIT-I: Vector Differentiation (13 Hours)

Vector Valued functions of a single scalar variable - Differential operators; Definitions - The vector Differential operator ∇ - The operator $a \cdot \nabla$ - The Gradient (or slope) of a scalar point function - simple problems.

UNIT –II: Vector Integration (12 Hours)

Line integrals - Conservative field - irrotational- Normal surface integral - Flux across a surface - Solenoidal vector - Volume integral - Simple problems.

UNIT–III: Theorems of Vector Calculus (12 Hours)

Gauss Divergence Theorem -Green's Theorem - Stokes' Theorem- Simple problems and Verification of the theorems for simple problems.

UNIT-IV:Fourier Series (12 Hours)

Fourier Series -Definition –Fourier Series expansions of periodic functions - Odd & Even functions in Fourier series- Properties of Odd & Even functions.

UNIT–V: Half Range Fourier Series (11 Hours)

Half- range Fourier series –definition –Half range Sine series & Cosine series –Change of interval- Combinations of series

Total Lecture Hours- 60

COURSEOUTCOME

The students should be able to

1. Describe vector differentiation.
2. Determine gradient vector fields and find potential functions.
3. Categorize the theorems for simple problems.
4. Demonstrate Fourier series to study the behavior of periodic functions.
5. Calculate the Finite Half range Fourier Cosine & Sine transform and apply it in solving boundary value problems

TEXT BOOKS

1. Khanna.M.L.2008-2009, Vector Calculus, 15th Edition. Jai Prakash Nath & Co. Meerut
2. .Narayanan. S and Manicavachagom Pillay T. K. 2014. Calculus Volume – III. S. Viswanathan Pvt. Ltd., Chennai.

UNIT – I Chapter 1: Section 1 of [1]

Chapter 2: Section. 1, 2, 3, 4of [1]

UNIT – II Chapter 3: Section. 1, 2, 3, 4 of [1]

UNIT – III Chapter 3: Section. 5 & 6 of [1]

UNIT – IV Chapter 6: Section. 1 to 3 of [2]

UNIT – V Chapter 6: Section. 4 to 7 of [2]

REFERENCEBOOK(S)

1. Gene H. Golub and Charles F. Van Loan, 2013. Matrix Computations, Fourth Edition. Johns Hopkins University Press, Maryland.
2. Jerrold Franklin. 2020. Understanding Vector Calculus. Dover Publications, New York.
3. Miroslav Lovric. 2007. Instructor's Solutions Manual to Vector Calculus, Wiley & Sons, Inc., United States.
4. Dr. Arumugam and Prof. A. Thangapandi Issac, Fourier series, New Gamma Publishing House (Nov 12)
5. S. Narayanan, T.K. Manicavachagam Pillai, Calculus, Vol. II S. Viswanathan Pvt Limited, 2003.

E-RESOURCES

1. www.whitman.edu
2. www.ppup.ac.in
3. <http://ppup.ac.in/e-Content/edetails.php?id=682>
4. <http://www.tutorialspoint.com>
5. <http://ocw.mit.edu>

SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE
(AUTONOMOUS)



SUNDARAKKOTTAI, MANNARGUDI- 614016
(For the Candidates admitted in the academic year 2022 – 2023)

DEPARTMENT OF MATHEMATICS
NON MAJOR ELECTIVES

Semester: IV- NME - I : Business Mathematics - II

Ins. Hrs./Week: 2

Course Credit: 2

Course Code:23NMEMA42

UNIT – I: Coordinate Geometry (6 Hours)

Introduction – Directed Line – Quadrants and Coordinates – Coordinates of Mid-Points – Distance between two points - Section Formula – External Division – Coordinates of Centroid – Area of a Triangle – Collinearity of Three Points – Area of a Quadrilateral – Locus of a Point – The Straight Line – Slope or Gradient of a Straight line – Different forms of equations of a straight line – General equation of a straight line – Intersecting Lines – Concurrent Lines – Angle between two straight lines – Tangent and Normal.

UNIT – II (6 Hours)

Circle – Equation of circle – Different forms of Circle – General equation of Circle – Equation of tangent to Circle - Equation of a Normal to Circle - Equation of tangent to Circle in slope form Ellipse – parabola – Standard equations of Parabola – Forms of a Parabola – Equation of the Tangent - Equation of the Normal.

UNIT – III: Vector Algebra (6 Hours)

Vectors – Types of Vectors – Operations on Vectors – Addition – Properties of Operation of Addition – Subtraction – Multiplication by a Scalar – Orthonormal Bases – Product of two Vectors – Scalar Product or Dot Product of two vectors – Properties of scalar product – Vector Product or Cross Product – Properties of Vector product.

UNIT- IV: Matrix Algebra (6 Hours)

Introduction - Definition - Types of Matrices - Scalar Multiplication of a Matrix - Equality of Matrices - Addition and Subtraction - Multiplication - Properties - Transpose of a Matrix.

UNIT – V (6 Hours)

Determinants of a Square Matrix - Determinants of Order Two - Cramer's rule - Determinants of Order three - Sarrus diagram - Properties of Determinants - Expansion of the determinants - Minors of a Matrix - Adjoint of a Square Matrix - Inverse of a Matrix.

Total Lecture Hours – 30

COURSE OUTCOME

The students will be able to

1. To improve the knowledge of Straight line and different forms of straight lines and their applications in solving problems.
2. Promote the concepts in Circle, Tangent and normal and solution of problems.
3. Solve problems based on the concepts of Addition, subtraction, scalar product and vector product.
4. Apply the knowledge in matrix and Inverse of a matrix in solving problems.
5. Understand the concept of determinants.

TEXT BOOKS

1. D.C.Sancheti and V.K.Kapoor, 2017. Business Mathematics, Revised Edition. Sultan Chand & Sons, Educational Publishers, New Delhi.
UNIT - I Chapter 15 : Sec. 15.1 to 15.21
UNIT - II Chapter 15 : Sec. 15.22 to 15.36
UNIT - III Chapter 19 : Sec. 19.1 to 19.13
UNIT - IV Chapter 20 : Sec. 20.1 to 20.10
UNIT - V Chapter 20 : Sec. 20.11 to 20.22

REFERENCE BOOK(S)

1. Gupta, 2019. Saxena Dr.Sinha, Business Mathematics, SBPD Publications.
2. Mariappan.P, 2015. Business Mathematics, Pearson India Education Services Pvt. Limited.
3. Rayarikar.A.V and Dixit.P.G, 2019. Business Mathematics, Nirali prakashan advancement of knowledge.
4. Shuka.S.M, 2019. Business Mathematics, Sahitya Bhawan Publications, Revised.
5. Vittal.P.R, 2018. Mathematics Foundation, Re-Edition. Margham Publications,

E_RESOURCES

1. https://www.academia.edu/40468313/Business_Mathematics1stedition
2. <https://www.coursehero.com/file/35285098/BASIC-MATHEMATICS-Coordinate-Geometrypdf/>
3. https://www.academia.edu/10235680/BUSINESS_MATHEMATICS
4. <https://bnmjjwinf292.com/mk3ngxw9g?key=0f22c1fd609f13cb7947c8cabfe1a90d&submetric=14961611>
5. https://www.researchgate.net/publication/281838644_An_Introduction_to_Business_Mathematics

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DEPARTMENT OF MATHEMATICS
SKILL BASED ELECTIVE

Semester: IV-SBE-I : QUANTITATIVE APTITUDE I

Ins. Hrs. / Week: 2

Course Credit: 2

Course Code: 23SBEMA1

UNIT- I (6 Hours)

Numbers – HCF & LCM of numbers.

UNIT- II (6 Hours)

Decimal Fractions and Simplification

UNIT- III (6 Hours)

Surds and Indices – Percentage

UNIT- IV (6 Hours)

Ratio and Proportion – Partnership.

UNIT -V (6 Hours)

Average

Total Lecture Hours- 30

COURSE OUTCOME

The students should be able to

1. Calculate the HCF & LCM of numbers.
2. Solve the simplification.
3. Calculate the percentage.
4. Calculate the ratio and proportion
5. Calculate the average

TEXT BOOK(S)

1. Scope and treatment as in “Quantitative Aptitude” by R.S.Aggarwal, S.Chand & Company Ltd., Ram Nagar, New Delhi (2007)

UNIT I Chapters 1 & 2

UNIT II Chapter 3 & 4

UNIT III Chapters 9 &10

UNIT IV Chapters 12 & 13

UNIT V Chapters 6
