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 2021–2022)

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 ** #	21LC101	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	21MA101	Differential and Integral Calculus	5	4	3	25	75	100
		Core Course (CC) – II	21MA102	Trigonometry and Series	4	4	3	25	75	100
		First Allied Course (AC) – I	21APY101	Allied Physics – I	4	3	3	25	75	100
		First Allied Course (AP) – I	21APY102P	Allied Physics Practical – I	3	2	3	40	60	100
	IV	Value Education		Value Education	2	2	3	25	75	100
		TOTAL			**30**	**21**				**700**
II	I	Language Course (LC) – II-Tamil*/Other Languages** #	21LC201	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	21MA203	Probability & Statistics	6	5	3	25	75	100
		Core Practical (CP) – I	21MA204P	Practical – Statistics	3	3	3	25	75	100
		First Allied Course (AC)– II	21APY203	Allied Physics – II	4	3	3	25	75	100
		First Allied Course (AP) – II	21APY204P	Allied Physics Practical – II	3	2	3	40	60	100
	IV	Environmental Studies		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) – IV	22MA305	Analytical Geometry-3D	4	4	3	25	75	100
		Core Course (CC) – V	22MA306	Classical Algebra and Theory of Numbers	5	4	3	25	75	100
		Second Allied Course (AC) –I	22ACS301	Introduction of Computers &Office Automations	4	4	3	25	75	100
		Second Allied Course (AP) – I	22ACS302P	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		Totai
								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	22MA407	Differential Equations and Laplace Transforms	4	4	3	25	75	100
		Core Course (CC) – VII	22MA408	Sequences and Series	4	4	3	25	75	100
		Second Allied Course (AC) – II	22ACS403	Fundamentals of C Programming	3	2	3	25	75	100
		Second Allied Course (AP) – II	22ACS404P	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)– VIII	23MA509	Vector Calculus and Fourier Series	6	4	3	25	75	100
		Core Course (CC) – IX	23MA510	Real Analysis	6	5	3	25	75	100
		Core Course (CC) – X	23MA511	Numerical Methods with MATLAB Programming	5	4	3	25	75	100
		Core Practical (CP) – II	23MA512P	Numerical Methods with MATLAB Programming(P)	2	2	3	40	60	100
		Major Based Elective – I	23MBEMA1:1/ 23MBEMA1:2	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**	**26**				**800**
VI	III	Core Course (CC) – XI	23MA613	Modern Algebra	6	5	3	25	75	100
		Core Course (CC) – XII	23MA614	Complex Analysis	6	5	3	25	75	100
		Core Course (CC) – XIII	23MA615	Mechanics	6	5	3	25	75	100
		Major Based Elective – II	23MBEMA2:1/ 23MBEMA2:2	Graph Theory/Discrete Mathematics	5	5	3	25	75	100
		Core Course (CC) – XIV	23MAPW	Project	6	6	-	-	-	100
	V	Gender Studies	23UGGS		1	1	3	25	75	100
		Extension Activities			-	1	-	-	-	-
		SWAYAM (EXTRA)				4*				
		TOTAL			**30**	**28**				**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	13	57
Core Practical	2	05
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 10^{th} +2 (Regular Stream);

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

those who studied Tamil upto 10^{th} +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		Title of the Paper
III		NME - I	22NMEMA31	Business Mathematics - I
IV		NME -II	22NMEMA42	Business Mathematics - II

SKILL BASED ELECTIVE (NME) OFFERED BY THE DEPARTMENT

Semester	Part	Course		Title of the Paper
IV		SBE-I	22SBEMA1	Quantitative Aptitude-I
V		SBE-II	23SBEMA2	Quantitative Aptitude-II
V		SBE-III	23SBEMA3	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 <u>THREE questions</u> in 1200 words

16 . Unit I

17 . Unit II

18 . Unit III

19 . Unit IV

20 . Unit V

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

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

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

Ins. Hrs./Week: 6 **Course Credit**: 4 **Course Code**: 23MA509

UNIT-I: Vector Differentiation **(17 Hours)**

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

UNIT –II: Vector Integration **(17 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 **(18 Hours)**

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

UNIT-IV:Fourier Series **(18 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 **(20 Hours)**

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

Total Lecture Hours- 90

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. MiroslavLovric. 2007. Instructor's Solutions Manual to Vector Calculus, Wiley & Sons, Inc., United States.
4. Dr.Arumugam and Prof A.ThangapandiIssac ,Fourier series ,New Gamma Publishing House (Nov12)
5. S.Narayanan ,T.K ManicavachagamPillai,Calculus , Vol .II S.ViswanathanPvt 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

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V- CC-IX : Real Analysis

Ins. Hrs./Week: 6 **Course Credit**: 5 **Course Code**: 23MA510

UNIT-I: Real Numbers **(19 Hours)**

Introduction to Real Number system-Field axioms-Theorems about field properties-Order relation in R- Absolute value of a real number & its properties- Completeness- Supremum & Infimum, Examples-Order completeness-Some important subsets of R-Intervals-Countable & Uncountable sets.

UNIT-II: Neighbourhoods and Limits **(17 Hours)**

Introduction-Neighbourhoods-Open sets-Closed sets-Limit point of a set -Definitions and theorems-Limit of a function -Definitions,Examples,Theorems-One sided limits-Limit x approaches c - Algebra of limits, Definitions and theorems- Infinite limits, Examples.

UNIT-III: Continuous Functions **(18 Hours)**

Continuous functions -Definitions, Theorems - Types of discontinuity, Examples- Algebra of continuous functions -Boundedness of continuous functions,Theorems- Intermediate value theorem.

UNIT-IV: Derivability **(16 Hours)**

Introduction -Derivability on an open interval- Derivability on closed interval- Derivability & Continuity -Algebra of derivatives -Chain rule-Inverse Function theorem on derivatives - Darboux's theorem on derivatives.

UNIT-V: Mean Value Theorems **(20 Hours)**

Rolle's theorem – Examples on Rolle's theorem -Lagrange's Mean value theorem-Examples on Lagrange's Mean Value theorem - Cauchy's Mean value theorem- Taylor's Theorem with Lagrange form of remainder-Taylor's theorem with Cauchy form of remainder.

Total Lecture Hours- 90

COURSE OUTCOME

The students will be able to

1. Acquire knowledge about basic properties of real number system.
2. Gain about the knowledge of Neighbourhood and limit of a function.
3. Enhance about the concept of continuous and discontinuous functions.
4. Develop the knowledge of derivability.
5. Assimilate the concept of Mean value theorems.

TEXT BOOKS

1. Singhal.M.K & Asha rani Singhal, 2011. A First Course in Real Analysis,R.Chand & Co., New Delhi.
   UNIT- I Chapter 1 : Sec. 1 to 10
   UNIT- II Chapter 2 : Sec.2 to5 & Chapter 5 : Sec. 1.1 to 1.6

UNIT -III Chapter 5 : Sec. 2 to 6
UNIT -IV Chapter 6 : Sec. 1 to 5
UNIT- V Chapter 7 : Sec. 1 to 4

REFERENCE BOOK(S)

1. Apostol .T.M., 1973. Mathematical analysis, Narosa publishing house.
2. Malik, Arrora, 1992. Mathematical analysis,Wiley Eastern Ltd.
3. Shanthi Narayan, 1995. A Course of Mathematical Analysis, Chand & Co .
4. Sunil k.Mittal, 2013. Real analysis, Pragathi Pragasam publications.
5. Walder Rudin, 1976. Principles of Mathematical analysis, McGrawhil book company.

E- RESOURCES

1. https://www.math.ucdavis.edu/~hunter/intro_analysis_pdf/intro_analysis.pdf
2. http://pdvpmtasgaon.edu.in/uploads/dptmaths/Real_AnalysisBySizweMabizela.pdf
3. https://www.math.ucla.edu/~awertheim/Bootcamp/Notes/Real%20Analysis%20Lectupdf
4. http://pdvpmtasgaon.edu.in/uploads/dptmaths/Real_AnalysisBySizweMabizela.pdf
5. https://www.jirka.org/ra/realanal.pdf

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V-CC-X: Numerical Methods with MATLAB Programming

Ins. Hrs./Week: 5 **Course Credit**: 4 **Course Code**: 23MA511

UNIT - I: Solving Problems in MATLAB (14 Hours)

MATLAB Environment: Getting Started – MATLAB Windows – Solving Problems in MATLAB – Variables – Working with Matrices – Scalar Operations – Array Operations – Scientific Notation – Display Format - Saving your work – Saving Variables – Script M- Files - Predefined MATLAB Functions – Using Predefined Functions – Elementary Math Functions – Trigonometric Functions – Data Analysis Functions – Simple Analysis – Maximum and Minimum – Mean and Median – Sums and Products – Random Numbers – Uniform Random Numbers – Gaussian Random Numbers – Computational Limitations - Special Values and Functions.

UNIT – II: Plotting (15 Hours)

Introduction to Plotting – Two Dimensional Plots – Basic Plotting – Annotating Plots – Other Types of Two Dimensional Plots – Polar Plots – Logarithmic Plots – Bar Graphs and Pie Charts – Histograms – Subplots - Three Dimensional Plotting – Three Dimensional Line Plot – Surface Plots – Mesh Plots – Surf Plots – Contour Plots - Editing Plots from the Menu Bar – Programming in MATLAB: Introduction – Problems with two Variables – Input /Output – User defined Input – Output Options – Formatted Output – Functions – Syntax – Local Variables – Naming Function M-files – Rules for Writing and Using Function M-files.

UNIT – III: Differentiation and Integration (14 Hours)

Introduction to Differentiation and Integration – Differentiation – Integration - Numerical Integration – Trapezoidal Rule and Simpson's Rule – MATLAB Quadrature Functions - Numerical Differentiation – Difference Expressions – diff. Function.

UNIT – IV: Algebraic and transcendental equations (16 Hours)

Curve Fitting – Fitting a Straight line and fitting a Parabola – Solving algebraic and transcendental equations – False position method and Newton Raphson method – Solving simultaneous algebraic equations – Gauss Seidel method Gauss elimination method – Solved Problems.

UNIT – V: Interpolation (16 Hours)

Interpolation – Newton's forward and backward difference formulae – Lagrange's interpolation formulae - Numerical integration using Trapezoidal and Simpson's one – Third rules – Solution of ODE'S – Euler method and Runge – Kutta fourth order method - Solved Problems.

Total Lecture Hours- 75

COURSE OUTCOME

The students will be able to

1. Explain the basic properties of MATLAB.

2. Describe the concepts of Plotting..
3. Discuss the concepts of Numerical Differentiation and Integration.
4. Combine to solve the algebraic and transcendental equations.
5. Identify the Interpolation.

TEXT BOOKS

1. Delores M. Etter, David C. Kuncicky, 2009. Holly Moore, Introduction to MATLAB 7, Published by Dorling Kindersley (India) Pvt. Ltd., licenses of Pearson Education in South Asia (For Units I to III).
2. Venkatraman M. K., 2001. Numerical methods in Science and Engineering, Fifth Edition, National Publisher Company (For Units IV and V).

UNIT I	Chapter 2 : Sec. 2.1 to 2.3
	Chapter 3 : Sec. 3.1, 3.3, 3.4 of (1)
UNIT II	Chapter 4 : Sec. 4.1 to 4.3
	Chapter 5 : Sec. 5.1 to 5.3 of (1)
UNIT III	Chapter 7 : Sec. 7.3.
	Chapter 8 : Sec. 8.4 & 8.5 of (1)
UNIT IV	Chapter 1 : Sec. 1.7 & 1.8
	Chapter 3 : Sec. 4 & 5
	Chapter 4 : Sec. 2, 6 of (2).
UNIT V	Chapter 6 : Sec. 3, 4
	Chapter 8 : Sec. 4
	Chapter 9 : Sec. 8, 10
	Chapter 11 : Sec. 10, 16 of (2)

REFERENCE BOOK(S)

1. Amos Gilat, 2014. Matlab: An Introduction with Applications, 5th Edition, JohnWiley, New York.
2. George Lindfield, John Penny, 2018. Numerical Methods: Using Matlab, 4th Edition. Academic Press, U.S.
3. Rudra Pratap, 1996. Getting Started with MATLAB, South Asia Edition, OXFORD University Press, England.
4. Sankara Rao K, 2004. Numerical Methods for Scientists and Engineers, Second Edition, Prentice-Hall of India Pvt. Ltd, New Delhi.
5. Saumyen Guha, Rajesh Srivastava, 2010. Numerical Methods: For Engineering and Science, OXFORD University Press, England.

E-RESOURCES

1. http://www.uop.edu.pk/ocontents/A%20Guide%20to%20MATALB.pdf
2. http://mayankagr.in/images/matlab_tutorial.pdf
3. https://www.mathworks.com/help/pdf_doc/matlab/matlab_prog.pdf
4. https://perhuaman.files.wordpress.com/2014/07/metodos-numericos.pdf
5. https://www.coursehero.com/file/28550858/numerical-analysis-1pdf

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V-CP-II: Numerical Methods with MATLAB Programming (P)

Ins. Hrs./Week: 2 **Course Credit**: 2 **Course Code:** 23MA512P

LIST OF PRACTICALS

1. Linear Interpolation
2. Lagrange's Method of Interpolation
3. Curve Fitting
4. Trapezoidal Rule of Integration
5. Simpson's 1/3 Rule of Integration
6. Newton-Raphson Method of solving equations
7. False Position Method of solving equations
8. Gauss-Seidel Method of solving simultaneous equations
9. R-K fourth order method of solving differential equations
10. Euler's Method of solving differential equations

COURSE OUTCOME

The students will be able to

1. Learned features of MATLAB as a programming tool. They are fully familiar with all the features of MATLAB software and easily handle the software.
2. New teaching model which includes theory & practical running simultaneously is introduced to our students. This method is very effective and helped to develop programming skills and technique to solve mathematical problems.
3. Learned graphic features of MATLAB and they can use this feature effectively in various applications.
4. Use MATLAB as a simulation tool.
5. Work as a 'MATLAB programmer' in the industry because of the hands on practical sessions. This job oriented course will help students to get the jobs in future.

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V-MBE- I (1) : Operations Research

Ins. Hrs./Week: 5 **Course Credit**: 5 **Course Code**: 23MBEMA1:1

UNIT –I: Linear programming problem (15 Hours)

Linear programming problem - Mathematical formulation – Illustrations on Mathematical formulation on Linear Programming Problems – Graphical solution method - some exceptional cases – Canonical and standard forms of Linear Programming Problem - Simplex method.

UNIT –II (15 Hours)

Use of Artificial Variables (Big M method - Two phase method) – Duality in Linear Programming - General primal-dual pair - Formulating a Dual problem - Primal-dual pair in matrix form - Dual simplex method.

UNIT –III: Transportation and Assignment Problem (15 Hours)

Transportation problem - LP formulation of the TP - Solution of a TP - Finding an initial basic feasible solution(NWCM-LCM-VAM) – Degeneracy in TP - Transportation Algorithm (MODI Method) - Assignment problem - Solution methods of assignment problem – special cases in assignment problem.

UNIT – IV: Sequencing Problem (15 Hours)

Sequencing Problem - Processing n jobs through two machines - Processing n jobs through K Machines - Processing two jobs through K machines - Queuing Theory – Queuing system – classification of Queuing models - Poisson Queuing system Model I (M/M/1):(∞/FIFO) – Model II (M/M/1):(∞/SIRO) - Model III (M/M/1):(N/FIFO) – Model IV (Generalized Model).

UNIT – V: PERT and CPM (15 Hours)

PERT and CPM – Basic components – logical sequencing – Rules of network construction- Critical path analysis – Probability considerations in PERT.

Total Lecture Hours - 75

COURSE OUTCOME

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

1. Identify and develop operational research models from the verbal description of the real system.
2. Understand the mathematical tools that are needed to solve Optimization problems.
3. Formulate and solve problems as networks and graphs.
4. Develop a report that describes the model and solving technique, analyze the results and propose recommendations in language understandable to the decision making processes in management engineering.
5. Use CPM and PERT techniques, to plan, schedule and control project activities.

TEXT BOOKS

1. Sundaresan.V, Ganapathy Subramanian.K.S and Ganesan.K, 2002. Resource Management Techniques, A.R. Publications.

UNIT–I	Chapter 2	: Sec. 2.1 to 2.6
	Chapter 3	: Sec. 3.1.1 to 3.1.3
UNIT–II	Chapter 3	: Sec. 3.2, 3.2.1,3.2.2
	Chapter 5	: Sec. 5.1 to 5.5
UNIT – III	Chapter 7	: Sec. 7.1 to 7.3
	Chapter 8	: Sec. 8.1 to8.6
UNIT – IV	Chapter 14	: Sec. 14.1 to 14.4,14.6,14.7
	Chapter 13	: Sec. 13.1 to 13.8
UNIT–V	Chapter 15	: Sec. 15.1 to 15.7

REFERENCE BOOK(S)

1. Gupta.P.K and Manmohan, 2010. Operations Research, Sultan Chand and sons Educational publishers, New Delhi.
1. Hamdy A. Taha, 2005. Operations Research, 7th Edn. Prentice Hall of India Private Limited, New Delhi.
2. Kalavathy.S, 2007. Operations Research, Fourth Edition, Vikas Publishing House Pvt. Ltd, 2007.
3. Taha H.A, 2002. Operations Research: An introduction, 7th edition. Pearson Prentice Hall.
4. KantiSwarup, Gupta.P.K and ManMohan, 2007. Operations Research, 13th Edition,Sultan Chand and Sons.

E_RESOURCES

1. https://www.researchgate.net/publication/333748649_Chapter_-01_Operations_Research
2. https://www.researchgate.net/publication/297715752_Linear_Programming
3. https://www.gatexplore.com/transportation-problem-study-notes/
4. https://www.researchgate.net/publication/325223720_An_Assignment_Problem_and_Its_Application_in_Education_Domain_A_ Review_and_Potential_Path
5. http://ndl.ethernet.edu.et/bitstream/123456789/90288/6/operations%20research%20handout.pdf

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DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: V-MBE- I (2): Mathematical Modelling

Ins. Hrs./Week: 5 **Course Credit**: 5 **Course Code**:23MBEMA1:2

UNIT-I: Modelling through ODE of first order (16 Hours)

Mathematical modelling through Difference equations - Linear Growth and Decay Models – Non Linear Growth and Decay Models – Compartment Models – Mathematical modelling in Dynamics through ODE of first order - Mathematical modelling of Geometrical Problems through ODE of first order.

UNIT-II: Modelling through systems of ODE of first order (15 Hours)

Mathematical modelling in Population Dynamics – Mathematical modelling of Epidemics through Systems of ODE of first order – Compartment Models through Systems of ODE – Mathematical modelling in Economics through Systems of ODE – Mathematical models in Medicine, Arms Race, Battles and International Trade in terms of Systems of ODE.

UNIT-III: Modelling through ODE of Second Order (14 Hours)

Mathematical modelling of Planetary Motions – Mathematical modelling of Circular Motion - Motion of Satellites – Mathematical modelling through Linear Differential Equations of second order.

UNIT-IV: Modelling through Difference Equations (16 Hours)

Some Simple Models – Basic Theory of Linear Difference Equations with Constant Coefficients –Mathematical modelling through Difference Equations in Economics and Finance – Mathematical modelling through Difference Equations in Population Dynamics and Genetics.

UNIT-V: Modelling through Graphs (14 Hours)

Situations that can be modeled through Graphs – Mathematical Models in Terms of Directed Graphs - Mathematical Models in Terms of Signed Graphs - Mathematical Models in Terms of Weighted Digraphs.

Total Lecture Hours - 75

COURSE OUTCOME

The students will be able to

1. Study the mathematical models in first and second order ODE.
2. Know some models in the part of economics and finance.
3. Talk about Mathematical Modelling through Linear Differential Equations.
4. Obtain imperative models on Epidemics.
5. Learn about Solutions that can be modelled through Graphs.

TEXT BOOKS

1. Kapur, J.N. 2003. Mathematical Modelling. New Age International (P) Ltd, Publishers, New Delhi.

UNIT – I	Chapter 2: Sec.2.1 to 2.6
UNIT – II	Chapter 3: Sec.3.1 to 3.5
UNIT – III	Chapter 4: Sec.4.1 to 4.3
UNIT – IV	Chapter 5: Sec.5.1 to 5.4
UNIT – V	Chapter 7: Sec.7.1 to 7.4

REFERENCE BOOK(S)

1. Giordano, P.R, Fox, W.P and Horton, S.B. 2014. A First course in Mathematical Modelling. Cengage Learning India Private Limited.
2. Kapur, J.N. 1988. Mathematical Modelling. Wiley Eastern Limited, New Delhi.
3. Kapur, J.N. 1999. Mathematical Models in Biology and Medicine. Affiliated East–West Press Pvt. Limited, New Delhi.
4. Meerschaert, M.M. 2013. Mathematical Modelling. Elsevier.

E- RESOURCES

1. https://www.simiode.org/resources/4016/download/ChapterNine-Mathematical_Models_with_DEs.pdf
2. https://jvanderw.une.edu.au/Lecture1_IntroToMathModelling.pdf
3. https://people.maths.bris.ac.uk/~madjl/course_text.pdf
4. http://www.mtm.ufsc.br/~daniel/matap/IntMatMod.pdf
5. https://www.math.colostate.edu/~gerhard/MATH331/331book.pdf

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SENGAMALA THAYAAR EDUCATIONALTRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

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

DEPARTMENT OF MATHEMATICS

SKILL BASED ELECTIVE

Semester: V-SBE-II : QUANTITATIVE APTITUDE- II

Ins. Hrs. / Week: 2 **Course Credit: 2** **Course Code: 23SBEMA2**

UNIT- I **(6 Hours)**

Chain Rule – Time and Work.

UNIT- II **(6 Hours)**

Time and Distance –Problems on Trains.

UNIT- III **(6 Hours)**

Boats and Streams

UNIT- IV **(6 Hours)**

Simple Interest – Compound Interest.

UNIT -V **(6 Hours)**

Stocks and Shares

Total Lecture Hours- 30

COURSE OUTCOME

The students should be able to

1. Calculate the time and work.
2. Solve the time and distance.
3. Calculate the boats and strems.
4. Calculate the simple interest.
5. Analyse the stoocks and shares.

TEXT BOOK(S)

1.Scope and treatment as in "Quantitative Aptitude" by R.S.Aggarwal, S.Chand&company limited, Ram Nagar, New Delhi – 2015.

UNIT I	Chapters 14 & 15
UNIT II	Chapters 17 & 18
UNIT III	Chapters 19
UNIT IV	Chapters 21 & 22
UNIT V	Chapters 29

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SENGAMALA THAYAAR EDUCATIONALTRUST WOMEN'S COLLEGE

(AUTONOMOUS)

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

DEPARTMENT OF MATHEMATICS

SKILL BASED ELECTIVE

Semester: V-SBE-III : QUANTITATIVE APTITUDE- III

Ins. Hrs. / Week: 2 **Course Credit: 2** **Course Code: 23SBEMA3**

UNIT- I **(6 Hours)**

Profit and Loss.

UNIT- II **(6 Hours)**

Area – Volume and Surface Area.

UNIT- III **(6 Hours)**

Clocks

UNIT- IV **(6 Hours)**

Permutations and Combinations.

UNIT -V **(6 Hours)**

Problems on Age

Total Lecture Hours- 30

COURSE OUTCOME

The students should be able to

1. Calculate the profit and loss.
2. Solve the area.
3. Calculate the clocks.
4. Calculate the permutations.
5. Analyse the problems on age.

TEXT BOOK(S)

1.Scope and treatment as in "Quantitative Aptitude" by R.S.Aggarwal, S.Chand&company limited, Ram Nagar, New Delhi – 2015.

UNIT I Chapter 11
UNIT II Chapters 24 &25
UNIT III Chapter 28
UNIT IV Chapter 30
UNIT V Chapter 8

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

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

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: VI-CC-XI: Modern Algebra

Ins. Hrs./Week: 6 **Course Credit**: 5 **Course Code**: 23MA613

UNIT – I: Groups (16 Hours)

Groups : Definition (only) - Permutation Groups – Cycle - Transposition – Subgroups – Centre - Normaliser - Cyclic Groups - Generator - Order of an Element – Cosets and Lagrange's Theorem; Left coset – Right coset – Index – Euler's theorem – Fermat's theorem.

UNIT – II: Groups Continued (17 Hours)

Normal Subgroups and Quotient Groups - Isomorphism – Cayley's theorem – Automorphism – Inner automorphism – Homomorphism; Canonical homomorphism – Epimorphism – Monomorphism - homomorphic image – Endomorphism – Kernel – Fundamental theorem of homomorphism.

UNIT – III: Rings (18 Hours)

Definitions and Examples of ring - Elementary properties of rings – Boolean ring – Isomorphism - Types of rings; Commutative ring – Ring with identity – Unit – Skew field – Field – Zero divisor – Integral domain - Characteristic of a ring – Subrings – Subfield – Ideals – Left ideal – Right ideal – Principal ideal domain - Quotient rings.

UNIT – IV: Rings & Vector Space (20 Hours)

Maximal and Prime Ideals - Homomorphism of rings; Epimorphism – Monomorphism – Endomorphism – Natural homomorphism – Kernel - Fundamental theorem of homomorphism - Vector spaces : Definition and examples – Subspaces - Linear transformation; Monomorphism – Epimorphism – Isomorphism – linear functional – Kernel - Fundamental theorem of homomorphism – Span of a set; Linear combination – Linear span.

UNIT – V: Vector Space Continued (19 Hours)

Linear independence; Finite dimensional – Linearly independent- Linearly dependent –Basis and Dimension - Maximal linearly independent set – Minimal generating set – Rank and Nullity**.**

Total Lecture Hours- 90

COURSE OUTCOME

The students will be able to

1. Learn the concept of Groups & Subgroups.
2. Understand the concept of Normal Subgroups.
3. Learn Ring Theory.
4. Understand the concept of Vector space.
5. Demonstrate knowledge and understanding of Basis, dimension.

TEXT BOOKS

1. Arumugam.S and Thangapandi Isaac.A, 2014. Modern Algebra, SciTech Publications (India) Pvt. Ltd., Chennai.
   UNIT - I Chapter 3 : Sec. 3.1, 3,4 to 3.8
   UNIT - II Chapter 3 : Sec. 3.9 to 3.11
   UNIT - III Chapter 4 : Sec. 4.1 to 4.8
   UNIT - IV Chapter 4 : Sec. 4.9 & 4.10, Chapter 5 : Sec. 5.1 to 5.4
   UNIT - V Chapter 5 : Sec. 5.5 to 5.7

REFERENCE BOOK(S)

1. Herstein.I.N, 2012. Topics in Algebra, Second Edition. Wiley Eastern Limited.
2. John, B. Fraleigh, 1999. A First Course in Abstract Algebra, Fifth Edition, Addison-Wesley Publishing company.
3. Serge Lang, 2002. Algebra, Eleventh edition. Springer – Verlag.
4. Shanti, 1992. A Text Book Of Modern Abstract Algebra, Fifth Edition, S. Chand & Company S. Chand & Company.
5. Sharma. A.K, 2010. Group Theory, Second edition Discovering Publishing Pvt. Ltd.

E_RESOURCES

1. https://www.math.stonybrook.edu/~aknapp/download/b2-alg-inside.pdf
2. http://www.freebookcentre.net/Mathematics/Abstract-Algebra-Books.html
3. https://www.freebookcentre.net/Mathematics/Algebra-Books-Download.html
4. http://www.cmat.edu.uy/~marclan/TM/Algebra%20i%20-%20Bourbaki.pdf
5. http://home.ustc.edu.cn/~liweiyu/documents/Algebra,%20Second%20Edition,%20Michael%20 Artin.pdf

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

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

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: VI-CC-XII: Complex Analysis

Ins. Hrs./Week: 6 **Course Credit**: 5 **Course Code**: 23MA614

UNIT- I: Analytic Functions (20Hours)

Functions of a Complex variable – Rational Function – Complex Valued Function - Limits – Theorems on Limits – Continuous Functions – Differentiability – Cauchy-Riemann Equations – C-R Equations in polar coordinates - Analytic Functions – Harmonic functions – Milne-Thompson Method.

UNIT - II : Bilinear Transformations (16 Hours)

Introduction - Elementary Transformations –Translation – Rotation – Magnification – Inversion – Bilinear Transformations – Cross Ratio – Fixed Points of Bilinear Transformation – Some Special Bilinear Transformations – Related Theorems and Problems in all these.

UNIT – III: Complex Integration (18 Hours)

Complex Integration – Definite Integral – Cauchy's Theorem – Cauchy's Theorem for Simply Connected Regions - Cauchy's Theorem for Multiply Connected Regions - Cauchy's Integral Formula – Maximum Modulo Theorem – Circular Disc - Higher Derivatives – Cauchy's Inequality Theorem – Liouville's Theorem – Morera's Theorem.

UNIT – IV: Series Expansion (17 Hours)

Series Expansion – Taylor's Series – Maclaurin's Series - Laurant's Series – Zeroes of an Analytic Functions – Singularities – Isolated Singularity - Removable Singularity – Poles – Essential Singularity – Meromorphic Function - Riemann;s Theorem - Related Theorems and Problems in all these.

UNIT – V: Calculus of Residues (19 Hours)

Residues – Lemma on Residues - Cauchy's Residue Theorem – Argument Theorem – Rouchy's Theorem - Fundamental Theorem of Algebra - Evaluation of Definite Integrals - Related Theorems and Problems in all these.

Total Lecture Hours- 90

COURSE OUTCOME

The students will be able to

1. Learn the concept of analytic functions.
2. Understand the concept of a simple and multiple connected regions.
3. Analyze Cauchy's theorem.
4. Learn the concepts of Taylor series and Laurent series.
5. Analyze Cauchy's Residue theorem.

TEXT BOOKS

1. Arumugam.S, Thangapandi Issac.A & Somasundaram.A, 2002. Complex Analysis, New

Scitech Publications Pvt. Ltd., India.

UNIT I Chapter 2 : Sec. 2.1 to 2.8
UNIT II Chapter 3 : Sec. 3.1 to 3.5
UNIT III Chapter 6 : Sec. 6.1 to 6.4
UNIT IV Chapter 7 : Sec. 7.1 to 7.4
UNIT V Chapter 8 : Sec. 8.1 to 8.3

REFERENCE BOOK(S)

1. Joseph Bak & Donald J. Newman, 2010,Complex Analysis, Third Edition, Springer.
2. Karunakaran.V, 2005. Complex Analysis, Second Edition, Narosa Publishing House Pvt. Ltd.
3. Lars V. Ahlfors, 1979. Complex Analysis, Third Edition. McGraw-Hill Book Company, Tokyo.
4. Manickavachaagam Pillai. T.K, 1994. Complex Analysis, S.Viswanathan Publishers Pvt. Ltd.
5. Sharma J.N, 1997. Functions of a Complex variable, 13th Edition. Krishna Prakasan Media(P) Ltd.

E_RESOURCES

1. http://www.maths.lth.se/matematiklu/personal/olofsson/CompHT06.pdf
2. https://www.math.ucla.edu/~honda/math520/notes.pdf
3. https://www.freebookcentre.net/Mathematics/ComplexAnalysis -Books-Download.html
4. http://www.math.chalmers.se/Math/Grundutb/CTH/mve025/1415/Dokument/komplexbok Beck.pdf
5. https://www.math.ucla.edu/~honda/math520/notes.pdf

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

(AUTONOMOUS)

SUNDARAKKOTTAI, MANNARGUDI- 614016

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

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: VI-CC- XIII: Mechanics

Ins. Hrs./Week: 6 **Course Credit**: 5 **Course Code**: 23MA615

UNIT-I: Force (18 Hours)

Newton's Laws of Motion: Introduction - Forces – Types of forces, Resultant of Two Forces on a Particle: Resolution of a force into its components – Component of a Force in a given direction - Related Problems - Resultant of three forces related to a triangle acting at a point – Resultant of several forces acting on a particle.

UNIT–II: Virtual Work (17 Hours)

Virtual Work: Introduction – Definitions - Related Problems – Virtual Displacement - Principle of Virtual Work - Related Problems.

UNIT –III: Hanging Strings (18 Hours)

Equilibrium of a Uniform Homogeneous String - Related Problems – Vertex and Directrix – List of Results – Results Pertaining to tension - Related Problems – Span – Sag – Suspension Bridge - Related Problems.

UNIT- IV: Rectilinear Motion Under Varying Force (18 Hours)

Simple Harmonic Motion – Harmonic Motion – Projection of a particle having a uniform Circular Motion – Composition of two Simple Harmonic Motions - Simple Harmonic Motion along a Horizontal Line - Simple Harmonic Motion along a Vertical Line - Related Problems.

UNIT –V: Projectiles (19 Hours)

Forces on a Projectile: Displacement as a combination of vertical and horizontal displacements- Nature of trajectory – Results pertaining to the motion of a projectile – Maximum horizontal range for a given velocity – Two Trajectories with a given speed and range – Projectile projected horizontally- Projectile. Projected on an Inclined Plane - Maximum Range on an Inclined Plane - Related Problems.

Total Lecture Hours-90

COURSE OUTCOME

The students will be able to

1. Understand the types of forces and its examples.
2. Understand the Equilibrium and limiting equilibrium of a particle.
3. Learn to recognize the path of a projectile and its simple problems.
4. Understand the equilibrium of strings, virtual work and simple harmonic motion for their skill development.
5. Understand a basic knowledge of projectile and evaluation of its characteristics

TEXT BOOKS

5. Duraipandian.P, 2010. Mechanics, S.Chand & Company Ltd., New Delhi.
   UNIT–I Chapter 2 : Sec 2.1 to 2.2
   UNIT–II Chapter 8

UNIT – III Chapter 9
UNIT – IV Chapter 12 : Sec. 12.1 to 12.3
UNIT –V Chapter 13 : Sec. 13.1 to 13.2

REFERENCE BOOK(S)

1. Kaushal Kumar Singh, 2011. Textbook of Dynamics, PHI Learning Pvt. Ltd., New Delhi.
2. Raisinghania.M.D, 2013. Dynamics, S. Chand & Company, Pvt. Ltd., New Delhi.
3. Ray.M, Sharma.G.C, 2006. A Textbook on Dynamics, S. Chand & Company, Pvt. Ltd., New Delhi.
4. Venkataraman.M.K, 2003. Statics, Agasthiar Publications, Trichy.
5. Venkataraman.M.K, 2008. Dynamics, Agasthiar Publications, Trichy.

E-RESOURCES

1. https://www.fisica.net/mecanicaclassica/introduction_to_statics_and_dynamics_by_rudra_pratap.pdf
2. http://ruina.tam.cornell.edu/Book/RuinaPratap-Jan-20-2015.pdf
3. https://www.academia.edu/36036711/Statics_and_Dynamics_11th_Edition_Jhonston
4. http://aghababaie.usc.ac.ir/files/1506464236211.pdf
5. https://www.researchgate.net/publication/334443002_Lectures_on_Engineering_Mechanics_Statics_and_Dynamics

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SUNDARAKKOTTAI, MANNARGUDI- 614016

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

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: VI-MBE- II (1): Graph Theory

Ins. Hrs./Week: 5 **Course Credit**: 5 **Course Code**: 23MBEMA2:1

UNIT -I: Graphs and Subgraphs (17 Hours)

Graphs and Subgraphs : Definitions – Graph – Adjacent Points – Adjacent Lines – Loop – Multigraph – Pseudo Graph – Complete Graph – Null Graph – Bigraph – Complete Bigraph – Degrees – Isolated Point – End Point – Related Theorems and corollaries – Definitions – Regular Graph – Cubic Graph – Related Problems. Subgraphs: Definitions – Subgraph – Super Graph – Spanning Subgraph – Induced Subgraph – Removal of the Point – Addition of the Line – Related Theorems – Isomorphism - Automorphism – Complement $\overline{G}$ – Self Complementary Graph – Related Theorems and Problems - Independent Sets and Coverings – Independence Number – Covering Number – Line Covering Number – Line Independence Number – Related Theorems.

UNIT –II: Connectedness (15 Hours)

Matrices – Adjacency matrix – Incidence Matrix - Operations on Graphs – Union, Sum, Product and Composition – Related Theorems - Connectedness: Walks, Trails, Paths and Cycles – Related Theorems and Problems – Connectedness and Components – Definitions – Connected – Disconnected – Components(Cut point Bridge) – Related Theorems – Eulerian Graphs: Definitions - . Eulerian Graphs – Arbitrarily Traversable Graph – Related Theorems.

UNIT –III: Trees (14 Hours)

Hamiltonian Graphs: Definition – Hamiltonian cycle – Hamiltonian Graph – Theta Graph – Closure – Related Theorems and Corollaries (Omit Chavatal Theorem 5.10) – Related Problems. Trees: – Characterization of Trees – Definition – A cyclic Group – Tree – Forest – Related Theorems and Corollaries– Centre of a Tree – Definition – Eccentricity – Radius central point – Centre – Related theorem.

UNIT- IV: Planarity (15 Hours)

Planarity: Definition and Properties – Planar graph – Non Planar graph – Plane graph – Faces – Exterior face – Boundary – Steriographic Projection – Polyhedral – Related Theorems and Corollaries - Characterization of Planar Graphs – Maximal Planar graph – Geometric Dual – Contractible - Related theorems and corollaries – Euler formula – Related Problems – Thickness, Crossing and Outer Planarity: Definition – Crossing Number – Outer Planar – Maximal outer Planar – Genus.

UNIT –V: Directed Graphs (14 Hours)

Directed Graphs: Definitions and Basic Properties – Directed Graph – Indegree – Outdegree – Degree Pair – Subdigraph – Induced Subdigraph – Underlying Graph – Converse Digraph – Complete Digraph – Functional Digraph – Related Theorems – Some Applications: Connector Problem – Weighted Graph - Kruskal's algorithm - Shortest Path Problem – Dijkstra's algorithm for finding a shortest path between two points.

Total Lecture Hours - 75

COURSE OUTCOME

The students will be able to

1. Understand the basic definitions of graphs and its applications of graphs.
2. Recognize the Characteristics of graph.
3. List and relate special graphs
4. Learn about Planar and Non Planar Graphs.
5. Understand the concepts of graph theory as an application of mathematics in information technology and its related fields.

TEXT BOOKS

1. Arumugam.S and Ramachandran.S, 2006. Invitation to Graph Theory, SCITE Publications (India) Pvt. Ltd., Chennai.

UNIT – I	Chapter 2	:	Sec. 2.1, 2.2, 2.3, 2.4, 2.6
UNIT – II	Chapter 2	:	Sec. 2.8, 2.9
	Chapter 4	:	Sec. 4.1, 4.2
	Chapter 5	:	Sec. 5.1
UNIT - III	Chapter 5	:	Sec. 5.2
	Chapter 6	:	Sec. 6.1, 6.2
UNIT - IV	Chapter 8	:	Sec. 8.1, 8.2, 8.3
UNIT – V	Chapter 10	:	Sec. 10.1
	Chapter 11	:	Sec. 11.1, 11.2

REFERENCE BOOK(S)

1. Balakrishnan.R and K.Ranganathan.K, 2000. A Textbook of Graph Theory, Universitext, Springer – Verlog, New York.
2. Bondy.J.A and Murthy.U.S.R, 1976. Graph Theory with Applications, Macmillan, London and Elsevier, New York.
3. Gary Chartrand and Ping Zhang, 2004. Introduction to Graph Theory, Tata McGraw-Hill Edition.
4. Narsingh Deo, 2004. Graph Theory with applications to Engineering and Computer Science, Prentice Hall of India.
5. Robin Wilson.J, 1996. Introduction to Graph Theory, Fourth Edition, Addison Wesley Longman Limited, England.

E-RESOURCES

1. https://www.maths.ed.ac.uk/~v1ranick/papers/wilsongraph.pdf
2. https://logic.pdmi.ras.ru/~gravin/storage/GT_Bondy_Murty_3.pdf
3. http://meskc.ac.in/wp-content/uploads/2018/12/A-Textbook-of-Graph-Theory- R.-Balakrishnan-K.Ranganathan.pdf
4. https://www.zib.de/groetschel/teaching/WS1314/BondyMurtyGTWA.pdf
5. https://www.math.kit.edu/iag6/lehre/graphtheo2015w/media/lecture_notes.pdf

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SENGAMALA THAYAAR EDUCATIONAL TRUST WOMEN'S COLLEGE

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SUNDARAKKOTTAI, MANNARGUDI- 614016

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

DEPARTMENT OF MATHEMATICS

B.Sc., MATHEMATICS

Semester: VI-MBE- II (2) Discrete Mathematics

Ins. Hrs./Week: 5 **Course Credit**: 5 **Course Code**:23MBEMA2:2

UNIT I **(15 Hours)**

Relations and Functions: Binary relations, equivalence relations and partitions, partial order relations, inclusion and exclusion principle, Hasse diagram. Functions, inverse functions, compositions of functions**.**

UNIT II **(15 Hours)**

Mathematical Logic: Logic operators, Truth tables, Normal Forms

UNIT III **(15 Hours)**

Mathematical Logic: Theory of Inference for the Statement Calculus, Predicate calculus, Inference Theory of Predicate Calculus, Quantifiers.

UNIT IV **(15 Hours)**

Lattices: Lattices as Partially Ordered Sets. Their Properties, Lattices as algebraic Systems, Sub lattices, Direct Product and homomorphism. Some Special Lattices - Complete, Complemented and Distributive Lattices, Isomorphic Lattices.

UNIT V **(15 Hours)**

Boolean algebra: Various Boolean identities, the switching Algebra Example, Sub Algebras, Direct Production and Homomorphism. Boolean Forms and their Equivalence, Midterm Booleanforms, Sum of Products, Canonical Forms. Minimization of Boolean Functions. TheKarnuagh Map Method

Total Lecture Hours - 75

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COURSE OUTCOME

The students will be able to

1. Understand the notion of mathematical thinking and algorithmic thinking.
2. Understand the basics of discrete probability and to apply them in problems solving.
3. Understanding the concept of relations and functions.
4. Study the concept of logical operators.
5. Study the concept of error detection, Group codes, decoding and error correction.

TEXT BOOK(S) :

1.Trembly. J.P & Manohar. R, Discrete Mathematical Structures with Applications to Computer
Science, McGraw- Hill.
UNIT–I Chapter 2 : Sec. 2.3, 2.4.1, 2.4.2 &2.4.3

UNIT–II Chapter 1 : Sec. 1.1 to 1.3
UNIT–III Chapter 1 : Sec. 1.4 to 1.6
UNIT–IV Chapter 4 : Sec. 4.1
UNIT–V Chapter 4 : Sec. 4.2 to 4.4

REFERENCE BOOK(S) :

1. Liu, C.L, Elements of Discrete Mathematics, McGraw-Hill Bookco.
2. K.D Joshi, Foundations of Discrete Mathematics, Wiley Eastern Limited.
3. Kenneth G. Roden, Discrete Mathematics and its Applications, McGraw- Hill international editions, MathematicsSeries.

E_RESOURCES :

1. https://www.freebookcentre.net/Mathematics/Discrete Mathematics-Books-Download.html
2. https://www.cs.yale.edu/homes/aspnes/classes/202/notes