E.M.G. YADAVA WOMEN'S COLLEGE, MADURAI – 625 014.

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DEPARTMENT OF MATHEMATICS

CBCS SYLLABUS

BACHELOR OF SCIENCE

PROGRAMME CODE - M

COURSE STRUCTURE

(w.e.f. 2021 – 2022 Batch onwards)

Annexure-7

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CBCS

DEPARTMENT OF MATHEMATICS – UG

(w.e.f. 2021- 2022 onwards)

COURSE STRUCTURE –SEMESTER WISE

Sem	Part	Sub code	Title of the Paper	Teaching hrs.(per week)	Exam Duration (hrs.)	Marks allotted			Credits
						CIA	SE	Total	
I	I	**211T1**	Part I:Tamil	6	3	25	75	100	3
	II	**212E1**	Part II: English	6	3	25	75	100	3
	III	**21M11**	**Core :** Calculus	5	3	25	75	100	5
	III	**21M12**	**Core :** Theory of equations & Number System	5	3	25	75	100	4
	III	**21AK1/21AP1**	**Allied I :** Chemistry/Physics	6	3	25	75	100	4
	IV	**21NMM1**	**NME:** Mathematics for Competitive Examinations-Paper-I	2	3	25	75	100	2
II	I	**211T2**	Part I:Tamil	6	3	25	75	100	3
	II	**212E2**	Part II: English	6	3	25	75	100	3
	III	**21M21**	**Core :** Sequences & Series	5	3	25	75	100	5
	III	**21M22**	**Core :** Differential Equations	5	3	25	75	100	4
	III	**21AK2/21AP2**	**Allied I :** Chemistry/Physics	4	3	25	75	100	4
	III	**21AK2P/21AP2P**	**Allied I :** Chemistry /Physics Practical	2	3	40	60	100	1
	IV	**21NMM2**	**NME:** Mathematics for Competitive Examinations-Paper-II	2	3	25	75	100	2
III	I	**211T3**	Part I:Tamil	6	3	25	75	100	3
	II	**212E3**	Part II: English	6	3	25	75	100	3
	III	**21M31**	**Core :**Modern Algebra	6	3	25	75	100	5
	III		**Core : Elective - I**	4	3	25	75	100	4
	III	**21AK3/21AP3**	**Allied I :** Chemistry/Physics	6	3	25	75	100	4
	IV	**21SEM31**	**SBE:** Applications of Differential Equations	2	3	25	75	100	2

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Sem	Part	Sub Code	Title of the Paper	Teaching hrs. (per week)	Exam Duration (hrs.)	Marks allotted			Credits
						CIA	SE	Total	
IV	I	**211T4**	Part I:Tamil	6	3	25	75	100	3
	II	**212E4**	Part II: English	6	3	25	75	100	3
	III	**21M41**	**Core :** Graph Theory	6	3	25	75	100	5
	III		**Core : Elective - II**	4	3	25	75	100	4
	III	**21AK4/21AP4**	**Allied I:** Chemistry/Physics	4	3	25	75	100	4
	III	**21AK4P/21AP4P**	**Allied I:** Chemistry /Physics Practical	2	3	40	60	100	1
	IV	**21SEM41**	**SBE:** Analytical Geometry –3 Dimension	2	3	25	75	100	2
V	III	**21M51**	**Core :** Modern Analysis	5	3	25	75	100	5
	III	**21M52**	**Core :** Statistics – I	5	3	25	75	100	4
	III	**21M53**	**Core :** Dynamics	4	3	25	75	100	4
	III		**Core : Elective - III**	4	3	25	75	100	4
	III	**21AA51**	**Allied II:** Programming in C	4	3	25	75	100	4
	III	**21AA5P**	**Allied II :** C Practical	2	3	40	60	100	1
	IV	**21SEM51**	**SBE:** Vector Calculus	2	3	25	75	100	2
	IV	**21SEM52**	**SBE:** Quantitative Aptitude	2	3	25	75	100	2
	IV	**214EV5**	Environmental Studies	2	3	25	75	100	2
VI	III	**21M61**	**Core :** Complex Analysis	6	3	25	75	100	5
	III	**21M62**	**Core :** Statistics – II	6	3	25	75	100	5
	III	**21M63**	**Core :**Numerical Methods	6	3	25	75	100	4
	III	**21AA61**	**Allied II :** Object Oriented Programming with C++	4	3	25	75	100	4
	III	**21AA6P**	**Allied II :** C ++ Practical	2	3	40	60	100	1
	IV	**21SEM61**	**SBE:** Discrete Mathematics	2	3	25	75	100	2
	IV	**21SEM62**	**SBE :**Combinatorics	2	3	25	75	100	2
	IV	**214VE6**	Value Education	2	3	25	75	100	2
	V	**215NS4/215PE4**	**Extension Activities** : N.S.S / Physical Education	-	3	25	75	100	1
			Total	180					140

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Electives:

Semester – III – (Choose any one)

1. Operations Research **- 21ME3A**
2. Astronomy **- 21ME3B**

Semester- IV-(Choose any one)

1. Statics **- 21ME4A**
2. Automata theory and Formal Language **-21ME4B**

Semester -V- (Choose any one)

1. Linear Algebra **– 21ME5A**
2. Fuzzy Sets **– 21ME5B**

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Title of the paper : Calculus
Semester : I **Contact hours: 5**
Sub Code : 21M11 **Credits : 5**

Objectives:

1. To develop the skill of solving application oriented problems in Differentiation.
2. To provide the basic ideas on definite integrals, double integral, triple integral and Beta & Gamma functions.

Unit-I Envelopes– Curvatures - Circle, Radius, and Centre of Curvature –Cartesian formulas for radius of curvature-the coordinate of the center of curvature-Evolutes and involutes.

Unit-II Radius of curvature in Polar Co-ordinates –P-r equation: Pedal equation of curves, Maxima & Minima of function of two variables

Unit-III Evaluation of definite Integrals, Reduction formulae.

Unit-IV Beta and Gamma functions.

Unit-V Double integrals -Evaluation of Double - Triple integrals – Change of Variables in double and triple integrals.

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Text Books:-

1. Narayanan. S and Manicavachagompillay .T.K, *Calculus*Volume – I Viswanathan.S (Printers & Publishers) Pvt., Ltd. (2013).

2. Arumugam .S and Thangapandi Isaac .A, *Calculus* New Gamma Publishing House, Palayamkottai (2005).

Chapters:-

Unit: I Chapter X: Section 1.1 to 1.4 & 2.1 to 2.5 Text Book I

Unit- II Chapter X: Section 2.6 to 2.8 Text Book I and

Chapter III: Section 3.7 from Text Book II (Part I)

Unit- III Chapter II: Section 2.6 & 2.8 from Text Book II (Part II)

Unit- IV Chapter IV: Section 4.1 Text Book II (Part II)

Unit-V Chapter III: Section 3.1 to 3.4 Text Book II (Part II)

Reference Books:-

1. Narayanan.S and Manicavachagompillay. T.K, *Calculus Volume - II*, Viswanathan.S (Printers & Publishers) Pvt., Ltd. (1996).

2. SanthiNarayan, *Differential Calculus* Shyam Lal Charitable Trust (1993)

3. Santhi Narayan *Integral Calculus* S.Chand& Company Ltd (1st Edition, 1994)

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Title of the paper: Theory of Equations & Number System

Semester	**: I**	**Contact hours**	**: 5**
Sub Code	**: 21M12**	**Credits**	**: 4**

Objectives:

1. To provide basic knowledge in Theory of Equations.
2. To enable the skill of analyzing the nature and determining of an equation by various methods.

Unit-I An equation with real coefficients, rational coefficients - Relation between the roots and coefficients of equations.

Unit-II Symmetric function of the roots-Sum of the power of the roots of an Equation-Newton's Theorem on the sum of the power of the roots - Transformations of Equations - Reciprocal Equations.

Unit-III To increase or decrease the roots of a given equation by a given quantity-Removal of terms – Transformation in general.

Unit-IV Descarte's rule of signs - Rolle's Theorem - Multiple roots – General solution of the cubic equation:Cardon's method. (Only)

Unit-V Prime and Composite numbers-The sieve of Eratosthenes-Divisors of a given number N-Euler's function (N) –Integral part of a real number-The highest power of a prime p contained in n!-The product of r consecutive integers is divisible by r!- Congruences- criteria

of divisibility of a number by 3,9,11 form the properties of congruences -Numbers in Arithmetical Progression-Fermat's theorem.

Text Books: -

1. Manicavachagom Pillay, T.K.,Natarajan T. & Ganapathy.K.S. *Algebra, Volume – I& II* S. Viswanathan (Printers&Publishers) Pvt., Ltd.(Oct 2014).

Chapters:

Unit -I Chapter 6: Sections 9 to 11

Unit -II Chapter 6: Sections 12 to 16

Unit -III Chapter 6: Sections 17, 19& 21

Unit- IV Chapter 6: Sections 24 to 26 & 34.1(i)

Unit -V Chapter 5: Sections 1 to 14& 16

Reference Books:-

1. ArumugamS. & Thangapandi Isaac*Algebra* [*Theory of Equations, Inequalities & Theory of Numbers]*New Gamma Publishing House, Palayamkottai, (2006).
2. Duraipandian P. and Kaylal Pachaiappa,Muhil Publishers (2008)
3. Malik S.B. *Basic Number Theory,*Vikas Publishing House Pvt., Ltd., (1995).

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Non Major Elective

Title of the paper : Mathematics for Competitive Examinations -Paper I
Semester : I **Contact hours: 2**
Sub Code : 21NMM1 **Credits : 2**

Objective:

To provide short cut techniques to solve Mathematical problems.

Unit-I Simple Interest

Unit-II Compound Interest

Unit-III Logarithms

Unit-IV Time and Distance

Unit-V Area, Volume and Surface Areas

Text Book:

Aggarwal, R.S. *Quantitative Aptitude,* Sultan Chand &Company, (2008).

Chapters:-

Unit- I Section I- 21

Unit - II Section I-22

Unit -III Section I-23

Unit - IV Section I-17

Unit -V Section I-24 & 25

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Reference Books:-

1. AbhijitGuha, *Quantitative Aptitude* ,Tata McGraw HillPublishingCompany(2011)
2. Dinesh Knaltar, *Quantitative Aptitude*, Dorling Kindersley (India) Pvt. Ltd., (2008).
3. Dr.Udayagiri Mohan Rao,*Quantitative Aptitude*,SciTech Publications (India) Pvt., Ltd., (2012).

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Title of the paper : Sequences and Series
Semester : II **Contact hours: 5**
Sub Code : 21M21 **Credits: 5**

Objectives:

1. To study the behaviour of Sequences and Series.
2. To study the applications of Summation of Series.

Unit-I Sets and Function- Interval in R-bounded set- least upper bound and greatest lower bound–Bounded Functions- Sequences-Bounded sequences-Monotonic Sequences-Convergent, Divergent and Oscillating Sequences –The algebra of limits – Behaviour of monotonic sequences.

Unit-II Sum theorems on limits – Subsequences – Limit Points - Cauchy sequences – The Upper and lower limits of a sequence.

Unit-III Infinite series– Comparison test – Kummer's test – Root test andCondensation test- Integral test**.**

Unit-IV Alternating series – Absolute convergence – Tests for convergence of series of arbitrary terms.

Unit-V Fourier series – Trigonometric series – Even and odd functions – Half range Fourier series – Extension to intervals of length 2π.

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Text Book: -

1. Arumugam .S. ThangapandiIsaac.A ,*Sequence and Series and Fourier Series* New Gamma Publishing House, Palayamkottai(2006).

Chapters:-

Unit -I Chapter 1:Sections: 1.1 to 1.5 & Chapter3: Sections: 3.1 to 3.7

Unit -II Chapter3:Sections: 3.8 to 3.12

Unit - III Chapter 4:Sections: 4.1 to 4.5

Unit -IV Chapter 5: Sections: 5.1 to 5.3

Unit -V Chapter 6

Reference Books:-

1. Bali N.P, Sequences *and Infinite series,* Golden MathsSeries, Firewall Media, An Imprint of Laxmi Publications Pvt,Ltd.(2009).
2. Dr.Chandrasekhara Rao K &Dr.Narayanan K.S *Real Analysis Volume I* (Chapters 4 &5) S.Viswanathan (Printers & Publishers) Pvt., Ltd. (2008)
3. Narayanan. S. and Manicavachagom Pillay T.K, *Algebra Volume – I,* S. Viswanathan (Printers & Publishers) Pvt., Ltd. (2000).

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Title of the paper : Differential Equations
Semester : II **Contact hours: 5**
Sub Code : 21M22 **Credits: 4**

Objectives:

1. To study the exact equations.
2. To study the First order, second order Differential Equations and Laplace Transformations.

Unit-I Exact differential equations- Integrating factors – Differential Equations of first order and higher degree.

Unit-II Linear equations with constant coefficients- Methods of finding complementary functions- Methods of finding particular integrals- Homogeneous Linear equations- Linear equations with variable coefficients (Type A only).

Unit-III Simultaneous linear Differential Equations- Total Differential Equations.

Unit-IV Laplace Transform and Inverse Laplace Transform - Solution of Differential equations using Laplace Transform.

Unit-V Formation of Partial Differential Equations –First order Partial Differential Equations –Methods of solving first order Partial Differential Equations.

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Text Book: -

S.Arumugam and A.Thangapandi Issac, *Differential Equations and Applications*, New Gamma publishing House, Palayamkottai(2011).

Chapters:-

Unit-I Chapter 1: Sections 1.3, 1.4 & 1.7

Unit -II Chapter 2: Sections 2.1 to 2.5.1

Unit-III Chapter 2: Sections 2.6 & 2.7

Unit- IV Chapter 3: Sections 3.1 to 3.3

Unit-V Chapter 4: Sections 4.1 to 4.3

Reference Books:-

1. Bali N .P. *Differential Equations,* Firewall Media (2011).

2. Frank Ayres JR, *Differential Equations*, Schaum's Outline Series (1988).

3. Narayanan S.and Manicavachagom Pillay T.K.,*Differential Equations,* S.Viswanathan (Printers&Publishers) Pvt., Ltd.The National Publishing Company (2004).

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Non Major Elective

Title of the paper : Mathematics for Competitive Examinations -Paper II
Semester : II **Contact hours : 2**
Sub Code : 21NMM2 **Credits : 2**

Objective:

To provide short cut techniques to solve Mathematical problems.

Unit-I Probability

Unit-II True Discount

Unit-III Banker's Discount

Unit-IV Heights & Distance

Unit-V Odd Man Out and Series

Text Book:

1.R.S. Aggarwal, *Quantitative Aptitude*, Sultan Chand &Company, (2008).

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Chapters:-

Unit -I Section I- 31

Unit -II Section I- 32

Unit - III Section I- 33

Unit -IV Section I-34

Unit - V Section I- 35

Reference Books:-

1. AbhijitGuha, *Quantitative Aptitude*, Tata McGraw Hill Publishing Company (2011)

2. Dinesh Knaltar, *Quantitative Aptitude*, Dorling Kindersley (India) Pvt. ltd., (2008).

3. Dr.Udayagiri Mohan Rao, *Quantitative Aptitude*, SciTech Publications (India) Pvt.Ltd. (2012).

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

(For Physics & Chemistry Major)

Sem	Sub Code	Title of the Paper	Teaching hrs. (per week)	Exam Duration hours	Marks Allotted			
					CIA	SE	Total	Credits
I	**21AM1**	Allied Mathematics-I	6	3	25	75	100	4
II	**21AM2**	Allied Mathematics-II	6	3	25	75	100	5

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Allied Mathematics for Physics & Chemistry

Title of the paper : Allied Mathematics – I
Semester : I **Contact hours: 6**
Sub Code : 21AM1 **Credits: 4**

Objectives:

1. To study the techniques of Trigonometry and Algebra.
2. To study the applications of Calculus and Analytical Geometry

Unit-I ALGEBRA Theory of equations-Formation of Equations -Relation between the roots and the coefficients.

Unit-II ALGEBRA Approximate Solutions of Numerical Equations: Finding the roots of the equation by Newton's and Horner's method

Unit-III CALCULUS Formula for Radius of Curvature – Evolutes: Centre and circle of curvature – Evaluation of Definite integrals - Reduction formula for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\text{cosec}^n x$, $\sec^n x$, $\cot^n x$ and $\sin^m x \cos^n x$.

Unit-IV TRIGNOMETRY Expansion Of $\sin\theta$, $\cos\theta$, $\tan\theta$ in powers of θ– Hyperbolic functions –Inverse Hyperbolic functions- Logarithm of complex number.

Unit-V ANALYTICAL GEOMETRY OF 3- DIMENSION Direction cosines -Direction ratios of a line -Equation of a plane -Angle between two planes.

Text Book:-

S.Arumugam and A.Thangapandi Isaac, *Ancillary Mathematics-1*, New Gamma Publishing House, Palayamkottai (June 2014).

Chapters:

Unit -I Chapter I : Sections 1.1&1.2

Unit -II Chapter I : Section 1.5

Unit -III Chapter II : Sections 2.2&2.3

Chapter III : Sections 3.3 &3.5

Unit -IV Chapter IV : Sections 4.3, 4.4, 4.5& 4.6

Unit -V Chapter V : Sections 5.3 5.4&5.5

Reference Books:

1. Manicavachagompillay T.K., Natarajan T. &.Ganapathy K.S, *Algebra Volume –I,* S. Viswanathan (Printers&Publishres Pvt., Ltd. (2000)

2 Narayanan S.&.Manicavachagom Pillay T.K, *Calculus Volume –II* S. Viswanathan (Printers& Publishers Pvt., Ltd. (1996)

3. Natarajan T. &Manicavachagom Pillay T.K, *Analytical Geometry* S. Viswanathan (Printers& Publishers Pvt., Ltd, (2009)

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Allied Mathematics for Physics & Chemistry

Title of the paper : Allied Mathematics – II **Contact hours: 6**
Semester : II **Credits: 5**
Sub Code : 21AM2

Objective:

To study Vector Calculus & to develop the skill on Statistical Methods.

Unit- I Vector Calculus Vector Algebra–Differentiations of Vectors- Gradient – Divergence and Curl.

Unit-II Matrices Matrices – Cayley Hamilton Theorem - Eigen values and Eigen vectors.

Unit-III Statistics Correlation- Rank Correlation - Regression.

Unit-IV Statistics Interpolation- Finite differences - Newton's Formula- Lagrange's Formula

Unit-V Fourier series Cosine and Sine series - Half range Fourier series.

Text Book:-

S.Arumugam and A.Thangapandi Isaac**,** *Ancillary Mathematics –II*
New Gamma Publishing House, Palayamkottai(November 2011).

Chapters:-

Unit- I Chapter 1: sections 1.1 to 1.4

Unit-II Chapter 3: sections 3.1, 3.2, 3.3&3.4

Unit-III Chapter 6:sections6.1 to 6.3

Unit- IV Chapter 7: sections 7.1 to 7.3

Unit -V Chapter 4

Reference Books:

1. Duraipandian P., LaxmiDuraipandian, *Vector Analysis*, Emerald, Publishers (1987)

2. Narayanan K.S. &manikavasagampillay T.K, *Modern Algebra Volume-II* S.Viswanathan(Printers & publishers Pvt.Ltd.(1996))

3. Pillai R.S.N., Bagavathi V., *Statistics* S.Chand & Company Ltd, Ram Nagar, New Delhi 110 055(2005)

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

(For Computer Science and B.C.A Major)

Sem	Course	Sub. Code	Title of the Paper	Teaching hrs.(per week)	Exam Duration hrs.	Marks Allotted			
						CIA	SE	Total	Credits
I	B.Sc., Computer science	**21AMS1**	Discrete Mathematics	5	3	25	75	100	5
II	B.Sc. Computer science & B.C.A	**21AMS2/ 21AMJ2**	Resource Management Techniques	5	3	25	75	100	5

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Title of the paper : Discrete Mathematics
Semester : I **Contact hours : 5**
Sub Code : 21AMS1 **Credits : 5**

Objective:

This paper enables to understand the basics and lay the foundation for learning further topics of Mathematics in Computer applications.

Unit-I Set Theory- Sets – Notation and Description of sets- Subsets-Operations on sets-Properties of set operations.

Unit-II Matrix Algebra –Basic Definitions Matrix Operations-The Inverse of a square matrix - Simultaneous linear equations- Eigen values and Eigen vectors.

Unit-III Logic - Introduction- TF – Statements- Connectives –The Truth table of a formula - Tautology-Tautological Implications and Equivalence of formulae.

Unit-IV Lattices and Boolean Algebras- Lattice**s-** Duality Principle- New Lattices Modular and Distributive Lattices - Boolean Algebras.

Unit-V Graphs and Subgraphs– Definition and examples – Degrees – Sub graphs-Isomorphism.

Text Books:

1. M.K.Venkataraman, N.Sridharan and N.Chandrasekaran, *Discrete Mathematics* The National Pulishing Company (September 2000)

2. S.Arumugam and S.Ramachandran, *Invitation to Graph Theory* SciTech Publications (India) Pvt.Ltd.

Chapters:

Unit -I Chapter 1: Section 1.2 to 1.4, 1.6 & 1.7

Unit -II Chapter 6: Section 6.1 to 6.3, 6.5 & 6.7

Unit -III Chapter 9: Section 9.1 to 9.3, 9.6 to 9.8

Unit -IV Chapter 10: Section 10.1 to 10.5

Unit- V Chapter 2.1 to 2.4

Reference Books:

1. S.Arumugam and A.Thangapandi Isaac, *Modern Algebra*. SCITECHPublications (INDIA) Pvt., Ltd.(2003)

2. Dr.M.Murugan, *Introduction to Graph Theory, Muthali* Publishing House Annanagar, Chennai (2005).

3. J. P. Tremblay &R.Manohar, Discrete *Mathematical structure with application to Computer Science* McGraw Hill Book Company, New York

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Title of the Paper: Resource Management Techniques

Semester : II **Contact hours: 5**

Sub Code : 21AMS2/21AMJ2 **Credits : 5**

Objective:

With the present development of the computer Technology, it is necessary to develop knowledge for solving problems in science and technology. It will be very useful for the students in constructing analytical methods.

Unit-I Origin and Development of O.R – Nature and features of O.R – Scientific method in O.R. –Advantages and limitations of Model- Linear programming problem-Mathematical formulation of L.P.P

Unit-II Graphical solution of L.P.P-General Linear Programming Problem –Canonical and standard form of L.P.P -Simplex Method Computational procedure.

Unit-III Use of Artificial variables-Two phase method-Big–M method

Unit-IV Mathematical formulation of assignment problem-Method for solving the assignment problem.

Unit-V Mathematical formulation of Transportation Problem (T.P) - Solution of a T.P-Finding an initial basic feasible solution – Test for Optimality -Degeneracy in T.P-Transportation Algorithm (MODI Method)

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Text Book: -

1. Kanthiswarup, P.K. Gupta and ManMohan, *Operations Research*, Sultan Chand & Sons Educational Publishers (2014).

Chapters:-

Unit -I Chapter 1&2 Sections: 1.2 to 1.4 and 1.6 &2.2 to 2.4

Unit- II Chapter 3& 4 Sections: 3.2, 3.4 3.5 &4.3

Unit- III Chapter 4: Section 4.4

Unit -IV Chapter 11: Sections 11.2&11.3

Unit-V Chapter 10: Sections 10.8 to 10.10 and 10.12&10.13

Reference Books:-

1. Dr. Arumugam S. &Thangapandi Isaac A., *Linear Programming,* New Gamma Publishing House (2004)

2. Gupta P.K., ManMohan, *Problems in Operations Research*, Sultan Chand & Sons, Delhi, (2003).

3. Sharma J.K., 4th Edition. *Operations Research Theory and Applications*, Macmillan Publishers India Ltd., (2010).

Annexure-7a

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI-14.

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Course Structure

UGC Sponsored Career Oriented Courses on Operations Research

CERTIFICATE COURSE **Duration: 90 hours**

Year	Sub Code	Title of the Paper	Exam Duration(hrs.)	Marks Allotted		
				CIA	SE	Total
I	21MC1	Certificate Course in Operations Research	3	25	75	100
	21MCP	Practical-I	3	40	60	100

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2021- 2022 onwards)

Title of the paper : Certificate Course in Operations Research
Sub Code : 21MC1 Contact hours: 2
Non Semester

Objective:

To study the techniques of Operations Research and Linear Programming.

Unit-I Vectors-Vector Inequalities-Linear Combination of Vectors- Hyper planes and hyper spheres-Convex Sets and their Properties-Support and Separating Hyper planes-Convex Functions-Local and Global Extreme.

Unit-II Origin and Development of Operation Research (O.R) - Nature and features of O.R.-Scientific method in O.R.- Modeling in O.R

Unit-III Linear Programming Problem-Mathematical formulation of the Problem-Illustration on Mathematical Formulation of LPPs

Unit-IV Graphical Solution Method-General Linear Programming Problem-Canonical and Standard Forms of LPP

Unit-V Mathematical formulation of the Assignment problem-Solution Methods of Assignment Problem - The Travelling Salesman Problem

Text book:

KantiSwarup, P.K.Gupta &ManMohan, *Operations Research,*
Sultan Chand &Sons, Educational Publishers,New Delhi.(2011)

Annexure-7a

Chapters:-

Unit -I Chapter0: Sections: 0.9 to 0.16

Unit -II Chapter1: Sections: 1.2 to 1.5

Unit - III Chapter 2: Section 2.2 to 2.4

Unit - IV Chapter 3: Sections 3.2, 3.4 &3.5

Unit - V Chapter 11: Sections 11.2, 11.3&11.7

Reference Books:-

1.Arumugam S. and Thagapandi Isaac A., *Topics in Operations Research: Linear Programming*,June 2012.NewGamma Publishing House, Palayamkottai (2012).

2. Gupta P.K.,Man Mohan, *Problems in Operations Research*, Sultan Chand & Sons, Delhi, (2003)

3. Sharma J.K., 4th Edition. *Operations Research Theory and Applications*, Macmillan Publishers India Ltd., (2010).

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(w.e.f. 2021- 2022 onwards)

Title of the paper : Practical I-Certificate Course in Operations Research
Sub Code : 21MCP Contact Hours: 2hrs
Non Semester

Objective:

To provide the practical knowledge of Operations Research by Solving Several Problems.

Problems

1. Problems in Linear Combination of vectors
2. Problems in Convex Sets
3. Problems in Hyper planes
4. Mathematical Formulation of LPP-Production Allocation Problem.
5. Mathematical Formulation of LPP-Diet Problem.
6. Graphical Method-Optimal Solution (Bounded)
7. Graphical Method-Optimal Solution (Unbounded)
8. Problems in Canonical form
9. Problem in Standard form
10. Balanced Assignment Problem
11. Unbalanced Assignment Problem
12. Travelling Salesman Problem

Annexure – 7b

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DEPARTMENT OF MATHEMATICS– UG

ADD ON COURSE
(w.e.f. 2021- 2022 onwards)

MS-Office

1. This Course is taken up by first year Mathematics students
2. Period of study : I Semester

COURSE STRUCTURE

Contact Hours: 30 hrs.
Credits: 1

S.No	Sem	Subject Code	Title of the Paper
1.	**I**	**21MAOC**	**Theory:** MS-Office
2.	**I**	**21MAOCP**	**Practical:** Practical in MS-Office

Annexure – 7b

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DEPARTMENT OF MATHEMATICS – UG
ADD ON COURSE
(w.e.f. 2021- 2022 onwards)
MS –Office

Title of the Paper : MS –Office
Semester : I **Contact hours: 30hrs.**
Sub Code : 21MAOC

Objective:

The students will be able to various basic concepts of MS word, MS Excel to build the skill of MS Power Point and also data entry operator.

Unit –I MS Word: Creating, Editing, Saving, Simple Character Formatting, Inserting Tables, Working with Images

Unit –II MS Word: Smart Art, Page Breaks Understanding Document Properties, Printing Text Documents, Using Lists & Styles

Unit -III MS Excel: Spreadsheet Basics, Working with Functions & Formulas Speeding Data Entry: Using Data Forms Formatting Worksheets,

Unit -IV MS PowerPoint: Opening, Viewing Creating& Printing Slides, Applying Auto Layouts, Adding Custom Animation

Unit -V MS PowerPoint: Using Slide Transitions, Graphically Representing Data: Charts &Graphs, Creating Professional Slide for Presentation

Annexure – 7b

Text Book:

MS-OFFICE by C. Nellai Kannan, NELS PUBLICATIONS, 137 Bharathiar Street, Thirunelveli-6 (2002)

PRACTICAL

Title of the Paper: Practical in MS-Office
Subject Code : 21MAOCP

List of Practical

I) Create a two paragraphs and do the following task

1. Justify the paragraphs.
2. 1.5 line spacing for 1st paragraph.
3. Use numbering to the sentences in the second paragraph. (Insert till 5)
4. Inserting 5 x5 table .
5. Make the text italic, text font size 15.
6. Insert page number at the left bottom of the page.

II).Create 3 slides and perform the following task

1. Type your name & college name in rectangle box
2. "MS Office Exam 2022" as footer, header, and watermark
3. Insert the following equation.
4. Insert shapes and picture

Annexure – 7b

III).Calculate the following table and do another task.

S.No.	Month	Income	Expenses	Saving
1	January	12000	8000	4000
2	February	18000	12000	6000
3	March	15000	23000	-8000
4	April	14000	11000	3000
Total		59000	54000	5000

1. Calculate Saving as Income - Expense using Table Formula.

2. Calculate Total Income, Expense, and Saving.

Annexure – 7c

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DEPARTMENT OF MATHEMATICS– UG
VALUE ADDED COURSE
(w.e.f. 2021- 2022 onwards)

INTRODUCTION TO R SOFTWARE

1. This Course is taken up by third year Mathematics students
2. Period of study: V Semester

COURSE STRUCTURE

Contact Hours: 30 hrs.
Credits: 1

S.No.	Sem	Subject Code	Title of the Paper
1.	**V**	**21MVAC**	**Theory**: Introduction to R Software
2.	**V**	**21MVACP**	**Practica**l: Practical in R programming

Annexure – 7c

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DEPARTMENT OF MATHEMATICS – UG

VALUE ADDED COURSE

Title of the paper : INTRODUCTION TO R SOFTWARE
Semester : V **Contact hours: 2 hrs.**
Sub Code : 21MVAC **Credits: 1**

Objectives:

1. Understand various data import methods and the Data Manipulation in R.
2. Build the skill to launch a successful Data Analyst Career.

Unit -I: Basic fundamentals, installation and use of software, data editing, use of R as a calculator, functions and assignments.

Unit -II: Matrix operations, missing data and logical operators. Conditional executions and loops, data management with sequences.

Unit -III: Data Management with repeats, sorting, ordering and lists. Vector indexing, factors, Data Management with strings, display and formatting.

Unit -IV: Data management with display paste, split, find and replacement, manipulations with alphabets, evaluation of strings, Data frames, import of external data in various file formats,

Unit -V: Statistical functions, compilation of data. Graphics and plots, statistical functions for central tendency, variation, skewness and kurtosis, handling of bivarite data through graphics, correlations, programming and illustration with examples.

Annexure – 7c

Text Book

R for Beginners by Emmanuel Paradise(12th September 2005) https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf

Book for Reference:

The Book of R - A First course in Programming and Statistics by TILMAN M. DAVIES https://web.itu.edu.tr/~tokerem/The_Book_of_R.pdf

PRACTICAL

Title of the Paper: Practical in R programming
Subject Code : 21MVACP

List of Practical:

1. What will be the outcome of following commands when executed over the R console take any value of x

i. y=x^2

ii. z=y^3+x^2

2. What is the correct outcome of the command? Take any value of vectors a, b, c, d, e and f

i. prod(c (a, b ,c, d) ^c (e, f))
ii. sum(c(a, b, c, d)^c(e, f))
iii. ceiling(c(a, b, c, d)^c(e, f))

Annexure – 7c

3. Form the 3x3 matrix in the form $\begin{pmatrix} a & b & c \\ 1 & 2 & 3 \\ x & y & z \end{pmatrix}$

4. Find transpose of 2x2 matrix.

5. Obtain the different types of scatter plot for the given vector.