

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

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)

Re-accredited (3rd Cycle) with Grade **A+** & **CGPA 3.51** by NAAC

DEPARTMENT OF MATHEMATICS



CBCS SYLLABUS

BACHELOR OF SCIENCE

PROGRAMME CODE - M

COURSE STRUCTURE

(w.e.f. 2017 – 2018 onwards)

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

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)

(Re-accredited (3rd Cycle) with Grade A⁺ & CGPA 3.51 by NAAC)

CBCS

DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 Batch onwards)

COURSE STRUCTURE

Sem	Part	Sub Code	Title of the Paper	Lecture hours /week	Exam hrs	Marks allotted			
						C.A	S.E	Total	Credits
I	I	171T1	Tamil	6	3	25	75	100	3
	II	172E1	English	6	3	25	75	100	3
	III	17M11	Core : Calculus	5	3	25	75	100	5
	III	17M12	Core : Theory of equations & Number System	5	3	25	75	100	4
	III	17AK1/17AP1	Allied I : Chemistry/physics	6	3	25	75	100	4
	IV	17NMM1	* Mathematics for Competitive Examinations- Paper-I	2	2	25	75	100	2
II	I	171T2	Tamil	6	3	25	75	100	3
	II	172E2	English	6	3	25	75	100	3
	III	17M21	Core : Sequences & Series	5	3	25	75	100	5
	III	17M22	Core : Differential Equations	5	3	25	75	100	4
	III	17AK2/17AP2	Allied I : Chemistry/Physics	4	3	25	75	100	4
	III	17AK2P/17AP2P	Allied I : Chemistry/Physics Practical	2	3	40	60	100	1
	IV	17NMM2	* Mathematics for Competitive Examinations- Paper-II	2	2	25	75	100	2
III	I	171T3	Tamil	6	3	25	75	100	3
	II	172E3	English	6	3	25	75	100	3
	III	17M31	Core : Modern Algebra	6	3	25	75	100	5
	III		Core : Elective - I	4	3	25	75	100	4
	III	17AK3/17AP3	Allied I : Chemistry/Physics	6	3	25	75	100	4
	IV	17SEM31	Skill Based Elective : Applications of Differential Equations	2	2	-	100	100	2

Sem	Part	Sub Code	Title of the Paper	Lecture Hrs Per Week	Exam Hrs	Marks allotted			
						C.A	S.E	total	credits
IV	I	171T4	Tamil	6	3	25	75	100	3
	II	172E4	English	6	3	25	75	100	3
	III	17M41	Core : Graph Theory	6	3	25	75	100	5
	III		Core : Elective - II	4	3	25	75	100	4
	III	17AK4/17AP4	Allied I : Chemistry/Physics	4	3	25	75	100	4
	III	17AK4P/ 17AP4P	Allied I : Chemistry/Physics Practical	2	3	40	60	100	1
	IV	17SEM41	Skill Based Elective : Analytical Geometry – 3 Dimension	2	2	-	100	100	2
V	III	17M51	Core : Modern Analysis	5	3	25	75	100	5
	III	17M52	Core : Statistics - I	5	3	25	75	100	4
	III	17M53	Core : Dynamics	4	3	25	75	100	4
	III		Core : Elective - III	4	3	25	75	100	4
	III	17AA51	Allied II : Programming in C	4	3	25	75	100	4
	III	17AA5P	Allied II : C Practical	2	3	40	60	100	1
	IV	17SEM51	Skill Based Elective : Vector Calculus	2	2	-	100	100	2
	IV	17SEM52	Skill Based Elective : Quantitative Aptitude	2	2	-	100	100	2
	IV	174EV5	Environmental Studies	2	2	-	100	100	2
VI	III	17M61	Core : Complex Analysis	6	3	25	75	100	5
	III	17M62	Core : Statistics - II	6	3	25	75	100	5
	III	17M63	Core : Numerical Methods	6	3	25	75	100	4
	III	17AA61	Allied II : Object Oriented Programming with C++	4	3	25	75	100	4
	III	17AA6P	Allied II : C ++ Practical	2	3	40	60	100	1
	IV	17SEM61	Skill Based Elective : Discrete Mathematics	2	2	-	100	100	2
	IV	17SEM62	Skill Based Elective : Combinatorics	2	2	-	100	100	2
	IV	174VE6	Value Education	2	2	-	100	100	2
	V	175NS4/ 175PE4	Extension Activities : N.S.S / Physical Education	-	2	-	100	100	1
	Total				180				

Note:

“*” Offered to Other Departments.

ELECTIVE PAPERS

Elective – I is to be chosen in Semester III from the following:

1. Operations Research - 17ME3A
2. Astronomy -17ME3B

Elective – II is to be chosen in semester IV from the following:

1. Statics -17ME4A
2. Automata theory and Formal Language -17ME4B

Elective – III is to be chosen in semester V from the following:

1. Linear Algebra -17ME5A
2. Fuzzy Sets -17ME5B

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Title of the paper	:	Calculus	
Semester	:	I	Contact : 5
Sub Code	:	17M11	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 – Evolutes and involutes.

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

Unit-III Definite Integrals and their properties, Reduction formulae.

Unit -IV Beta and Gamma functions.

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

Text Books:-

1. Narayanan . S. and . Manicavachagom pillay .T.K, *Calculus* Volume – I
(for unit I and II) S.Viswanathan (Printers & Publishers) PVT. LTD., (2013).
- 2 Arumugam S and Thangapandi Isaac A, *Calculus* (for unit,II,III,IV and V)
New Gamma Publishing House, Palayamkottai (2005).

Chapters:-

Unit – I : Chapter X : 281 to 313 from Text Book I

Unit – II : Chapter X : 313 to 323 from Text Book I and

Chapter III: 165 to 181 from Text Book II (Part I)

Unit – III : Chapter II : 363 to 373 and 381 to 398 from Text Book II (Part II)

Unit – IV : Chapter IV : 442 to 458 from Text Book II(Part II)

Unit – V : Chapter III :407 to 439 from Text Book II(Part II)

Reference Books:-

1. Narayanan S and Manicavachagom pillay T.K , *Calculus Volume - II*,
S.Viswanathan (Printers & Publishers) PVT. LTD., (1996).
2. Santi Narayan , *Differential Calculus* Shyam Lal Charitable Trust (1993).
3. Santi Narayan *Integral Calculus* S.Chand & Company Ltd. (1st Edition, 1994).

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Title of the paper	: Theory of Equations & Number System	Contact	: 5
Semester	: I	Credits	: 4
Sub Code	: 17M12		

Objectives:

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

Unit – I Theory of equation – Imaginary roots - Rational roots - 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 - Transformations of Equations - Roots multiplied by a given number -Reciprocal roots - Reciprocal Equations.

Unit – III To increase and 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.

Unit –V Theory of Numbers-Prime and Composite numbers-The sieve of Eratosthenes-Divisors of a given number N-Euler's function $\phi(N)$ –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-Numbers in Arithmetical Progression .

Text Books: -

1. Manicavachagom Pillay T.K., Natarajan T. and Ganapathy.K.S. *Algebra*

Volume – I & II

S. Viswanathan (Printers & Publishers) PVT. LTD., (Oct 2014).

Unit I : Chapter 6 : Sections 1 to 11

Unit II: Chapter 6 : Sections 12 to 16

Unit III: Chapter 6: Sections 17 , 19 and 21

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

Unit V: Chapter 5: Sections 1 to 14

Reference Books:-

1. Arumugam S. and Thangapandi Isaac *Algebra [Theory of Equations, Inequalities & Theory of Numbers]* New Gamma Publishing House, Palayamkottai (August 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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Title of the paper	: Mathematics for Competitive Examinations -Paper I		
Semester	: I	Contact	:2
Sub Code	: 17NMM1	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 & Distance**Unit- V** Area , Volume & Surface Areas

Text Book :

Aggarwal, R.S. *Quantitative Aptitude for Competitive Examinations*,
Sultan Chand & Sons Company ,(2008).

Chapters:-

Unit – I : Chapter 21 : 445 to 465

Unit – II : Chapter 22 : 466 to 486

Unit – III : Chapter 23 : 487 to 498

Unit – IV : Chapter 17 : 384 to 404

Unit – V : Chapter 24 & 25 : 499 to 548 & 549 to 587

Reference Books:-

1. Abhijit Guha, *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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Title of the paper	: Sequences and Series	Contact	:5
Semester	: II	Credits	:5
Sub Code	:17M21		

Objectives :

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

Unit – I Introduction – Sets, Function, bounded set, l.u.b and g.l.b. Sequences – Bounded, Monotonic Sequences Convergent, Divergent and Oscillating Sequences - Algebra of limits – Behaviour of monotonic sequences.

Unit – II Cauchy's first limit theorem – Cauchy's second limit theorem – Subsequences – Limit Points - Cauchy sequences – Upper and lower limits of sequences.

Unit – III Infinite series – Tests of convergence of series of positive terms – Comparison test – Kummer's test – Root test - Condensation and Integral test (Statement with proof and Simple Problems)

Unit – IV Alternating series – Absolute convergence – Tests of convergence of series of arbitrary terms. Rearrangement of Series.

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

Text Book: -

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

Chapters:-

Unit – I: Chapter 1 : Sections : 1.1 to 1.4 &

Chapter 3 :Sections : 3.1 to 3.7

Unit – II: Chapter 3 : Sections :3.8 to 3.12

Unit - III: Chapter 4 : Sections :4.1 to 4.5

Unit – IV: Chapter 5: Sections :5.1 to 5.4

Unit – V: Chapter 6

Reference Books:-

1. Bali N.P, *Sequences and Infinite series*, Golden Maths Series ,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).
4. Narayanan S and Manicavachagom Pillay T.K, *Trigonometry*,
S. Viswanathan (Printers & Publishers) PVT. LTD., (2000).

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(w.e.f. 2017- 2018 onwards)

Title of the paper	: Differential Equations	
Semester	: II	Contact :5
Sub Code	: 17M22	Credits :4

Objectives:

1. To study the Exact equations .
2. To study the First order and Second order Differential Equations and Laplace Transformations.

Unit - I Exact equation- Integrating factors – Differential Equation of first order higher degree.

Unit – II Linear equations with constant co-efficients- Methods of finding complementary functions- Homogeneous Linear equations- Linear equations with variable co-efficients – General solutions in terms of known Integral.

Unit - III Simultaneous linear Differential Equations

Simultaneous linear equations of the first order

$$\text{Methods for solving} \quad \frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$$

Total Differential Equations.

Unit – IV Laplace Transform - Evaluation of Integrals, Problems - Inverse Laplace Transforms – Solution of Ordinary Differential equations with constant co-efficient.

Unit - V Partial Differential Equation – Formation of Partial Differential Equations – First order Partial Differential Equations –Method of solving First order Partial Differential Equations.

Text Book: -

1.S.Arumugam and A. Thangapandi Issac, *Differential Equations and Applications*,
New Gamma Publishing House, Palayamkottai (2008).

Chapters:-

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

Unit II : Chapter 2 : Sections 2.1 to 2.5

Unit III: Chapter 2 : Sections 2.6 & 2.7

Unit IV: Chapter 3 : Sections 3.1 to 3.4

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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Title of the paper	: Mathematics for Competitive Examinations -Paper II	
Semester	: II	Contact : 2
Sub Code	:17NMM2	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 & Series

Text Book :

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

Chapters:-

Unit – I : Chapter 31 : 621 to 631

Unit – II : Chapter 32 : 632 to 636

Unit – III : Chapter 33 : 637 to 641

Unit – IV : Chapter 34 : 642 to 648

Unit – V : Chapter 35 : 649 to 657

Reference Books:-

1. Abhijit Guha, *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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Sem	Sub Code	Title of the Paper	Lecture hours per week	Exam hrs	Marks Allotted			
					C.A	S.E	Total	Credits
I	17AM1	Allied Mathematics - I	6	3	25	75	100	4
II	17AM2	Allied Mathematics - II	6	3	25	75	100	5

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CBCS**DEPARTMENT OF MATHEMATICS - UG**

(w.e.f. 2017- 2018 onwards)

ALLIED MATHEMATICS

(for Physics & Chemistry Major)

Title of the Paper	: Allied Mathematics - I	
Semester	: I	Contact : 6
Sub Code	:17AM1	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 –An n^{th} degree equation has exactly n roots-
Relation between the roots and the coefficients.

Unit -II Finding the roots up to two de cimals by Newton's and Horner's method-
Descartes' Rule of Signs.

Unit –III Calculus - Radius of Curvature - Centre of curvature of plane curve s –
Definite integrals - Reduction formula for $\sin^n x$, $\cos^n x$, $\tan^n x$, $\operatorname{cosec}^n x$, $\sec^n x$, $\cot^n x$ and
 $\sin^m x \cos^n x$ and simple problems.

Unit –IV Trigonometry -Expansions – Hyperbolic functions – Logarithm of
complex numbers.

Unit –V Analytical Geometry of Three Dimension - Direction cosines -Direction
ratios of a line -Angle between two straight lines - Equation of a plane .

Text Book:-

1. S.Arumugam and A.Thangapandi Isaac, *Ancillary Mathematics-I*, New Gamma Publishing House, Palayamkottai (1996).

Chapter:

Unit I - Chapter I : Sections 1 to 27

Unit II – Chapter I : Sections 40 to 48

Unit III – Chapter II : Sections 65 to 90 and 94 to 106 and 113 to 121

Unit IV - Chapter IV : Sections 153 and 180

Unit V - Chapter V : Sections 190 to 202

Chapter VIII : Sections 255 to 273

Reference Books :

1. Manicavachagom pillay 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 & Publishres PVT. LTD., (1996).
3. Natarajan T.& Manicavachagom Pillay T.K, *Analytical Geometry* S. Viswanathan, Printers & Publishres PVT. LTD., (2009).

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Title of the paper	:	Allied Mathematics – II	Contact : 6
Semester	:	II	Credits : 5
Sub Code	:	17AM2	

Objective :

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

Unit -I Vector Calculus - Vector Differentiation -Velocity, Acceleration -Vector differential operator - Gradient -Divergence and Curl and their simple properties- Directional derivative – Solenoidal - Irrotational vectors .

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

Unit –III Statistics : Correlation- Rank Correlation - Regression.

Unit-IV Statistics : Interpolation - Lagrange's and Newton's method .

Unit-V Fourier series - Trigonometric series - Even and Odd functions - Half range Fourier series.

Text Book:-

S.Arumugam and A.Thangapandi Isaac, *Ancillary Mathematics –II*
New Gamma Publishing House, Palayamkottai (2004).

Chapters:-

Unit – I : Chapter 1 : sections 1.1 to 1.4

Unit – II : Chapter 3 : sections 3.1 and 3.3,3.4

Unit – III : Chapter 6 : sections 6.1 to 6.3

Unit – IV : Chapter 7 : sections 7.1 to 7.3

Unit – V : Chapter 4

Reference Books :

1. Duraipandian P., Laxmi Duraipandian, *Vector Analysis*, Emerald Publishers, (1987).
2. Narayanan K.S. & Manikavasagam Pillay T.K, *Modern Algebra Volume-II*
S.Viswanathan, Printers & Publishers PVT. LTd., (1996).
3. Pillai R.S.N. & Bagavathi V., *Statistics And Company LTD.*, Ram Nagar, New Delhi-110055, (2005).

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Sem	Course	Sub Code	Title of the Paper	Lecture hours per week	Exam hrs	Marks Allotted			
						C.A	S.E	Total	Credits
I	B.Sc. Computer Science	17AMS1	Discrete Mathematics	5	3	25	75	100	5
II	B.Sc. Computer Science & B.C.A	17AMS2/ 17AMJ2	Resource Management Techniques	5	3	25	75	100	5

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Title of the paper	: Discrete Mathematics	
Semester	: I	Contact : 5
Sub Code	: 17AMS1	Credits : 5

Objective:

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

Unit – I Set theory-Notation & Description of sets-subsets-Operations on sets- Properties of set operations.

Unit – II Matrices- Operations-Inverse of a matrix – Determinant – Properties of determinant - Simultaneous linear equations- Eigen values and Eigen vectors.

Unit - III Logic - Introduction- Connectives - Truth table - Tautology-Implication - Equivalences.

Unit – IV Partial ordering-Posets-Hasse diagram-Lattices-Properties-Sub Lattices-Special Lattices-Boolean Algebra.

Unit – V Graph theory - Introduction – Definition and examples – Degrees – Subgraphs- Isomorphism.

Text Books:

1. M.K.Venkataraman, N.Sridharan and N.Chandrasekaran,
Discrete Mathematics, The National Publishing Company (September 2000).
2. S.Arumugam and S.Ramachandran,
Invitation to Graph Theory, Scitech Publications (India) Pvt. Ltd.

Unit I : Chapter 1: Section 1.1 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 10.34

Unit V : Chapter 2.0 to 2.4

Reference Books:

1. S.Arumugam and A.Thangapandi Isaac,
Modern Algebra. SCITECH Publications (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.
4. T. Veera Rajan, Discrete Mathematics with Graph theory & Combinatorics.
First Edition, Tata McGraw – Hill Publications Company Ltd.

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CBCS**DEPARTMENT OF MATHEMATICS - UG**

(w.e.f. 2017- 2018 onwards)

ALLIED MATHEMATICS

(for Computer Science & B.C.A Major)

Title of the Paper : Resource Management Techniques**Semester : II****Contact : 5****Sub Code :17AMS2 /17AMJ2****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 OR – 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-Slack and Surplus variables

Unit- II Graphical solution of L.P.P- Simplex Method-Computational procedure.

Unit- III Artificial variables technique-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-Optimal solution of T.P-Methods for obtaining an initial feasible solution-Optimal solution-Degeneracy in T.P-Unbalanced T.P.

Text Book: -

1. Kanthiswarup, P.K. Gupta and Man Mohan, *Operations Research*, Sultan Chand & Sons Educational Publishers, (2011).

Chapters:-

Unit – I: Chapter 1 & 2 Sections : 1.1 to 1.4 and 1.6 & 2.1 to 2.4

Unit – II: Chapter 3 & 4 Sections: 3.1 to 3.5 & 4.3

Unit - III: Chapter 4 : Section 4.4

Unit – IV: Chapter 11: Sections 11.2 to 11.5

Unit – V: Chapter 10: Sections 10.8 to 10.10 and 10.13

Reference Books:-

1. Dr. Arumugam S. & Thangapandi Isaac A., *Linear Programming*, New Gamma Publishing House, (2004).
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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Year	Sub Code	Title of the Paper	Lecture hours per week	Exam hrs	Marks Allotted		
					C.A	S.E	Total
I	17MC1	Certificate Course in Operations Research	2	3	25	75	100
	17MCP	Practical - I	1	3	40	60	100

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DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 onwards)

CERTIFICATE COURSE

Title of the paper : Operations Research

Sub Code : 17MC1

Non Semester

Contact : 2

Objective :

To study the techniques of Operations Research and
Linear Programming.

Unit-I Introduction-Origin and Development of O.R - Nature and features of O.R.-
Scientific method in O.R.- Modelling in O.R.

Unit-II General LPP- Mathematical formulation of a LPP- Canonical Form - Matrix
form-standard form.

Unit-III Linear programming problem-Definition-Feasible solution-Basic feasible
solution-Optimum basic feasible solution-Degenerate Solution- Slack and Surplus
variables –Graphical solution of a LPP.

Unit-IV The Assignment Problem - Mathematical formulation of the problem-
Hungarian Algorithm-Travelling Salesman Problem

Unit-V Transportation Problem - Finding feasible solution - North-West Corner method - Vogel's Approximation method - Optimal solution of Transportation problem (Both balanced & Unbalanced Transportation Problem).

Text book:

Kanti Swarup, P.K.Gupta & Man Mohan, *Operations Research*,
Sultan Chand & Sons, Educational Publishers, New Delhi, (2011).

Reference Books:-

1. Arumugam S. & Thagapandi Isaac A., *Topics in Operations Research: Linear Programming*, June 2012. New Gamma 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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DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 onwards)

CERTIFICATE COURSE

Practical I

Title of the paper : Operations Research

Sub Code : 17MCP

Non Semester

Contact : 1

Objective:

To Provide the practical, Knowledge of Operations Research by Solving Several Problems.

Problems

- 1.Mathematical Formulation of LPP-Production Allocation Problem.
- 2.Mathematical Formulation of LPP-Diet Problem.
- 3.Graphical Method-Optimal Solution(Bounded)
4. Graphical Method-Optimal Solution(Unbounded)
- 5.North West Corner Method
- 6.Row Minima Method.
7. Column Minima Method.
- 8.Least Cost Method
- 9.Vogels Approximation Method
- 10.Balanced Assignment Problem
- 11.Unbalanced Assignment Problem
- 12.Travelling Salesman Problem

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DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 onwards)

CERTIFICATE COURSE

UGC - Sponsored Career Oriented Course

Question Pattern (Internal)

(Theory Paper)

Sub Code: 17MC1

Maximum Marks: 25

Duration: 2 hrs

Part-A (5x1=5)

Answer all Questions:

(1 & 2) Fill in the blanks:

(3 to 5) Choose the Best Answer:

Part-B (2x5=10)

(6 to 10) Answer any Two out of Five Questions

Part -C (1x10=10)

(11 to 15) Answer any One out of Five Questions

Question Pattern (External)

(Theory Paper)

Sub Code: 17MC1

Maximum Marks: 75

Duration: 3 hrs

Part-A (10x1=10)

Answer all the Questions:

(1 to 5) Fill in the blanks (one question from each unit)

(6 to 10) Choose the Best Answer (one question from each unit)

Part-B (5x7=35)

(11 to 18) Answer any Five out of Eight Questions

Part -C (3x10=30)

(19 to 23) Answer any Three out of Five Questions

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DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 onwards)

CERTIFICATE COURSE

OPERATIONS RESEARCH

UGC - Sponsored Career Oriented Course

Practical

Sub Code: 17MCP

Duration : 3 hrs

Maximum Marks : 100

I. Internal - 40 Marks

II. External - 60 Marks

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(w.e.f. 2017- 2018 onwards)

Question Pattern (External)

Practical

Sub Code: 17MCP

Maximum Marks: 60

Duration : 3 hrs

Part-A (4x15=60 Marks)

(1 to 6) Answer any Four out of Six Questions

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Title of the paper	: Modern Algebra	
Semester	: III	Contact : 6 hours
Sub Code	: 17M31	Credits : 5

Objectives:

1. To study the basic Algebraic structures like Groups and Rings.
2. To study some standard theorems in Groups and Rings.

Unit – I

Groups - Definition and Examples - Elementary Properties of a groups – Equivalent Definitions of a Group – Permutation Groups- Subgroups .

Unit – II

Cyclic groups – Order of an Element-Cosets and Lagrange's Theorem.

Unit – III

Normal Subgroups and Quotient Groups - Isomorphism

Unit – IV

Homomorphism – Rings - Definitions and Examples - Elementary properties of rings.

Unit – V

Rings - Isomorphism - Types of Rings – Characteristic of a ring

–Sub rings

Text Book: -

1. S. Arumugam & A.Thangapandi Isaac, *Modern Algebra*, SCITECH Publications (INDIA) Pvt. Ltd., (2003).

Unit – I : Chapter 3:3.1 to3.5

Unit – II : Chapter 3: 3.6to3.8

Unit – III : Chapter 3 : 3.9 & 3. 10

Unit – IV : Chapter 3: 3.11 & Chapter 4: 4.1to4.2

Unit – V : Chapter 4: 4.3to 4.6

Reference Books: -

1. Prof.Chatterji P.N., *Modern Algebra*, Rajhan Prakasan Mandir Educational Publishers, Meerut U.P, (1986).
2. Narayanan K.S. and Manicavachagom Pillay T.K., *Modern Algebra Volume – II*, S.Viswanathan, Printers & Publishers Pvt. Ltd., (1996).
- 3.Venkatachalapathy S.G., *Modern Algebra*, Margham Publications, Second Edition, (2008).

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Title of the paper	: Operations Research	Contact	: 4 hours
Semester	: III	Credits	: 4
Sub Code	:17ME3A		

Objectives:

1. To study the concept of Linear Programming Problems.
2. To understand the applications of Operations Research.

Unit – I

Mathematical Formulation of the problem - Illustrations on mathematical formulation of Lpp- Graphical solution method –General linear programming problem-The computational procedure .

Unit – II

Use of Artificial variable - Degeneracy in Linear programming.

Unit – III

General primal – Dual pair – Formulating a Dual problem – Primal- Dual pair in Matrix form – Duality and Simplex Method – Dual Simplex Method.

Unit - IV

LP formulation of the Transportation Problem – Solution of a Transportation problem – Finding an initial basic feasible solution – Test for optimality – Transportation algorithm(MODI method) – Mathematical formulation of the Problem – Solution methods of Assignment Problem

Unit – V

Games and strategies – Two-person zero-sum games – Some basic terms – The Maximin – Minimax Principle - Games without saddle points- Mixed Strategies – Graphic Solution of $2 \times n$ and $m \times 2$ games – Dominance Property.

Unit – I : Chapter 2: 2.3&2.4 Chapter 3: 3.2&3.4 Chapter 4: 4.3

Unit – II : Chapter 4: 4.4 & 4.5

Unit – III : Chapter 5: 5.2 to 5.4, 5.7 & 5.9.

Unit – IV : Chapter 10: 10.2,10.8 to 10.10 , 10.13 & Chapter 11: 11.2& 11.3.

Unit – V : Chapter 17: 17.2 to 17.7.

Text Book: -

1. KanthiSwarup, P.K. Gupta & Man Mohan, *Operations Research*, Sultan Chand & Sons Educational Publishers, (2014).

Reference Books:-

1. Arumugam S. & Thangapandi Isaac A., *Linear Programming*, New Gamma Publishing House, (2004).
2. Gupta P.K. & Man Mohan, *Problems in Operations Research*, Sultan Chand & Sons, Delhi, (2003).
3. Sharma J.K., *Operations Research Theory and Applications*, Macmillan Publishers India Ltd., IV-Edition, (2010).

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DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 Batch onwards)

Title of the paper	: Astronomy	Contact	: 4 hours
Semester	: III	Credits	: 4
Sub Code	:17ME3B		

Objectives:

To understand the spherical triangles and Diagrammatic Representations in Astronomy.

Unit – I

Spherical Triangles – Solutions.

Unit – II

Four system of Co-ordinates – Sidereal time.

Unit – III

Diagrammatic Representations.

Unit - IV

Earth – Zones of Earth – Dip of Horizon.

Unit – V

Refraction – Tangent Formula and Cassini's formula.

Text Book: -

Kumaravelu and SusheelaKumaravelu, *Astronomy*, Muruga Bhavanum Publishers,
Chidhambara nagar, 2003.

Reference Books:-

G.V.Ramachandran, *Astronomy*, St.Joseph's College, Trichy.

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Title of the paper	: Applications of Differential Equations		
Semester	: III	Contact	: 2 hours
Sub Code	: 17SEM31	Credits	: 2

Objective:

To Study the Concept of Application of Differential Equations

Unit –I

Orthogonal Trajectories

Unit – II

Growth and decay

Unit –III

Continuous compound interest- The Brachistochrone problem

Unit – IV

Tautochronous property of the cycloid- Simple electric circuits

Unit – V

Falling bodies- Simple Harmonic Motion .

Unit – I : Chapter 6:6.1

Unit – II : Chapter 6:6.2

Unit – III : Chapter 6:6.3 & 6.4

Unit – IV : Chapter 6:6.5 & 6.6

Unit – V : Chapter 6:6.7 & 6.8

Text Book:

1. S.Arumugam & A.Thangapandi Isaac, *Differential Equations and Applications*, New Gamma Publishing House, (2008).

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., (2003).

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Title of the paper	: Graph Theory		
Semester	: IV	Contact	: 6 hours
Sub Code	: 17M41	Credit	: 5

Objectives:

1. To Provide Fundamental ideas in Graph Theory
2. To provide the complete knowledge in Graph Theory.

Unit – I

Graphs and Subgraphs : Definitions and Examples, Degrees-Subgraphs - Isomorphism – Independent sets and Coverings – Matrices – Operations on Graphs.

Unit – II

Degree Sequences - Graphic sequences - Connectedness: Walks , Trails and Paths – Connectedness and Components – Blocks – Connectivity.

Unit – III

Eulerian and Hamiltonian Graphs :Eulerian graphs-Hamiltonian graphs,Trees : Characterization of Trees – Centre of a Tree

Unit – IV

Matchings- Matchings in Bipartite Graphs- Planarity : Definition and Properties – Characterization of Planar Graphs – Thickness , Crossing and outer Planarity.

Unit – V

Colourability : Chromatic Number and Chromatic Index – The Five Colour Theorem – Four Colour problem – Chromatic polynomials.

Text Book :-

1. S. Arumugam and S . Ramachandran, *Invitation to Graph Theory*, SCITECH Publication (INDIA) Pvt. Ltd.

Unit – I : Chapter 2 : 2.1to 2.4 , 2.6 ,2.8 & 2.9

Unit – II : Chapter 3: 3.1 & 3.2 Chapter 4 : 4.1 to 4.4

Unit – III : Chapter 5 : 5.1 & 5.2 Chapter 6: 6.1 & 6.2

Unit – IV : Chapter 7 : 7.1 & 7.2 Chapter 8 : 8.1 to 8.3

Unit – V : Chapter 9 : 9.1 to 9.4

Reference Books :

1. Choudum S.A., *A First Course in Graph Theory*, Macmillan India Limited, Madras, (1994).
2. John clark , Derek Allantlolton, *A first look at Graph Theory*, Allied publisher Ltd., (1991).
3. J.A. Bondy and U.S.R. Murty, *Graph Theory*, The Macmillan Press Ltd., (1976).

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Title of the paper	: Statics	
Semester	: IV	Contact : 4 hours
Sub Code	: 17ME4A	Credits : 4

Objective:

To develop the skill to differentiate forces acting at a point and forces acting on a rigid body when the body is at rest.

Unit– I

Forces acting at a point – Resultant and Components- Simple cases of finding the resultant- Parallelogram of forces-Analytical Expression for the Resultant of two forces acting at a point- Triangle of forces –Perpendicular Triangle of forces- Converse of the Triangle of forces –The Polygon of forces- Lami's Theorem.

Unit – II

Resolution of a force – Components of a force along two given directions- Theorems on resolved parts – Resultant of any number of forces and coplanar forces acting at a point: Graphical Method & Analytical Method – Conditions of equilibrium of any number of forces acting upon a particle.

Unit – III

Parallel forces and Moments – Resultant of two like and unlike parallel forces – Resultant of a number of parallel forces acting on a rigid body-Conditions of Equilibrium of three coplanar parallel forces-Centre of two parallel forces- Moment of a force – Varignon’s theorem.

Unit – IV

Couples - Equilibrium of two couples - Equivalence of two couples-Couples in parallel planes – Representation of a couple by a vector- Resultant of coplanar couples - Resultant of a couple and a force.

Unit – V

Friction - Definition –Experimental results – Statical, Dynamical and Limiting friction- Laws of friction- Friction a passive force- Coefficient of friction angle of friction- Cone of friction -Friction on inclined planes - Simple problems.

Text Book:-

M.K. Venkataraman, *Statics*, 16th Edition, Agasthiar Publications, 2013.

Unit – I : Chapter 2 : 1 to 9

Unit – II : Chapter 2 : 11 to 16

Unit – III : Chapter 3 : 2 to 7

Unit – IV : Chapter 4: 1 to 10

Unit – V : Chapter 7 : 1 to 8 & 10 to 12

Reference Books:-

1. Dharmapadam A.V., *Statics*, S.Viswanathan (Printers and Publishers) Pvt , Ltd. 1st Edition, 2006.
2. Khanna M.L., *Statics*, 7th Edition, Jai Prakash Nath & Co, Garth Road, Meerut.
3. Venkatachalapathy S.G., *Statics*, Marghak Publications, Chennai, 2005.

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DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 Batch onwards)

Title of the paper	: Automata Theory and Formal Languages	Contact	: 4 hours
Semester	: III	Credits	: 4
Sub Code	:17ME4B		

Objectives:

To study Properties of Regular sets and Push down Automata.

Unit – I

Strings, Alphabets and Languages – Graphs and trees – Inductive proof- Set notation – Relations – Synopsis of the book.

Unit – II

Finite state system – Basic definitions – Non deterministic finite automata- Finite automata with Moves – Regular Expression – Two way finite automata.

Unit – III

Properties of Regular sets – The pumping lemma for regular sets – Closure properties of regular sets – The Myhill – Nerode Theorem and Minimization of finite automata.

Unit - IV

Properties of Regular sets – The pumping lemma for regular sets – Closure properties of regular sets – The Myhill – Nerode Theorem and Minimization of finite automata.

Unit – V

Properties of Regular sets – The pumping lemma for regular sets – Closure properties of regular sets – The Myhill – Nerode Theorem and Minimization of finite automata.

Text Book: -

1. John.E. Hopcroft, Jeffrey D. Ullman, *Introduction to Automata Theory, Languages and Computation* Narosa Publishing House, 1999.

Reference Books:-

1. Alexander Meduna, *Automata and Languages*, Springer, 2000.
2. ShyamalenduKandar, *Automata Theory and Formal Languages*, Dorling Kindersley (India) Pvt. Ltd., 2012.
3. Dr. M.K. Venkataramam, Dr.N.Sridharan, N. Chandrasekaran, *Discrete Mathematics*,The National Publishing Company, 2009.

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(w.e.f. 2017- 2018 Batch onwards)

Skill-Based Elective

Title of the paper	: Analytical Geometry of Three Dimension	
Semester	: IV	Contact : 2 hours
Sub Code	: 17SEM41	Credits : 2

Objective:

To study the concept of Analytical Geometry 3D

Unit-I

Planes -Equations of a plane -- Angle between two planes

Unit-II

Angle bisectors of two planes

Unit-III

Straight line –Equation of a straight line

Unit-IV

A plane and a line

Unit-V

Equation of two skew lines in simple form

Text Book:

1. S.Arumugam & Thangapandi Issac *Analytical Geometry 3 D and Vector Calculus*, New Gamma Publishing House, Palayamkottai, 2014.

Unit – I : Chapter 2: 2.1 & 2.2

Unit – II : Chapter 2: 2.3

Unit – III : Chapter 3:3.1

Unit – IV : Chapter 3:3.2

Unit – V : Chapter 3:3.3

Reference Books:

1. Natarajan T.& Manikavasagam Pillay T.K.,*Analytical Geometry*, S.Viswanathan (Printers & Publishers) Pvt. Ltd., 2009.
2. Santha S. & Pathinathan T., *Analytical Geometry*, Vijay Nicole Imprints Private Limited, 2009.
3. Shanti Narayan, *Analytical Solid Geometry*, S.Chand & Company Ltd, 1992.

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(for Physics & Chemistry Major)**

Sem	Sub		hours per week	Exam hrs	Marks Alloted			
					C.A	S.E	Total	Credit
III	17AM3	Allied Mathematics-III	6	3	25	75	100	4
IV	17AM4	Allied Mathematics-IV	6	3	25	75	100	5

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1. To study the techniques of Analytic functions in Complex Analysis and Differential Equations.
2. To study the brief structure about Groups and Laplace Transforms.

Unit-I

Differential Equations of First order - Exact differential equations –Methods of finding complementary functions – Methods of finding particular integrals.

Unit-II

Laplace Transform – Inverse Laplace Transform – Partial Differential Equations – Formations of Partial Differential Equations – Methods of solving first order partial differential equations.

Unit-III

Applications of Differential Equations – Growth and Decay– Simple electric circuits - Planetary motion.

Unit-IV

Analytic functions-Limits-Analytic functions(C-R equation(without proof))- Bilinear transformations- Cross ratio.

Unit-V

Groups –Definitions and examples- Elementary properties of a group- Permutation groups -Subgroups- Cyclic groups

Text Book:-

1. S.Arumugam & A.Thangapandi Isaac, Allied Mathematics –III,
New Gamma Publishing House, Palayamkottai, 2012.

Unit – I : Chapter 1: 1.3 Chapter 2: 2.2&2.3

Unit – II : Chapter 3 and Chapter 4: 4.1&4.3

Unit – III : Chapter 5: 5.2, 5.6 & 5.11

Unit – IV : Chapter 6: 6.1 to 6.3 Chapter 7: 7.2&7.3

Unit – V : Chapter 8: 8.1, 8.2, 8.4 to 8.6

Reference Books:

1. Manicavachagam Pillay T.K., Natarajan T.and Ganapathy K.S, *Algebra Volume-I*, S.Viswanathan (Printers & Publishers) Pvt. Ltd.
2. Narayanan S. & Manicavchagam Pillay T.K., *Differential Equations*, S.Viswanathan(Printers & Publishers) Pvt. Ltd, 2003.
3. Venkatraman M.K. Manorama Sridhar, *Differential Equations & Laplace Transforms*, The National Publishing Company, 2004.

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2017- 2018 Batch onwards)

Allied Mathematics for Physics & Chemistry

Title of the paper : Allied Mathematics - IV

Semester : IV

Sub Code : 17AM4

Contact : 6 hours

Credits : 5

Objectives :

1. To study the techniques of Operations Research and Linear Programming .
2. To study the applications of Assignment and Transportation Problem.

Unit- I:

Linear Programming Problems-Formulation of LPP – Mathematical formulation of a linear programming problem-solution of Linear Programming Problem-Graphical method

Unit- II:

Simplex Method

Unit- III

Big–M Method-Two Phase Method

Unit- IV:

Mathematical formulation of Transportation Problem-Degeneracy in Transportation Problem .

Unit- V:

Mathematical formulation of an Assignment problem-Solution to assignment problem.

Text Book: -

S.Arumugam & A.Thangapandi Isaac, *Topics in Operations Research - Linear Programming*, New Gamma Publishing House, Palayamkottai, 2012.

Unit – I : Chapter 3 : 3.1 to 3.4

Unit – II : Chapter 3: 3.5

Unit – III :Chapter 3: 3.6 & 3.7

Unit – IV : Chapter 4: 4.1 & 4.2

Unit – V : Chapter 5: 5.1 & 5.2

Reference Books :

1. Gupta P.K., ManMohan, *Problems in Operations Research*, Sultan Chand & Sons, Delhi, 2003
2. Kanthi swarup, Gupta P.K., and ManMohan, *Operations Research*, Sultan Chand & Sons Educational Publishers , 1997 .
3. Sharma J.K, 4th Edition. *Operations Research Theory and Applications*, Macmillan Publishers India Ltd., 2010.

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Sem	Course	Sub Code	Title of the Paper	Lecture hours per week	Exam hrs	Marks Allotted			
						C.A	S.E	Total	Credits
III	B.Sc Computer Science &B.C.A	17AMS3/ 17AMJ3	Graph Theory	5	3	25	75	100	5
IV	B.Sc Computer Science & B.C.A	17AMS4/ 17AMJ4	Numerical Methods	5	3	25	75	100	5

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Title of the Paper	: Graph Theory	
Semester	: III	Contact : 5 hours
Sub Code	: 17AMS3/17AMJ3	Credits : 5

Objective:

To enhance theoretical and modern application oriented studies in graph theory gives a brief idea about graphs , Independent sets, Walks, Trails, Paths, Blocks, Connectivity and Trees.

Unit-I:

Graphs and Subgraphs : Definition and Examples-Degrees – Subgraphs - Isomorphism.

Unit-II:

Independent sets and coverings –Matrices-Operations on Graphs-Degree Sequences.

Unit-III:

Connectedness : Walks, Trails and Paths-Connectedness and Components –Blocks-Connectivity.

Unit-IV:

Eulerian and Hamiltonian Graphs: Eulerian Graphs-Hamiltonian Graphs.

Unit-V:

Trees: Characterization of trees- Centre of a Tree-Planarity: Definition and properties.

Text Book:

1. S.Arumugam & S. Ramachandran, *Invitation to graph theory*,

SCITECH Publication (INDIA) Pvt. Ltd., 2016.

Unit – I : Chapter 2 : 2.1 to 2.4

Unit – II : Chapter 2 : 2.6, 2.8, 2.9 & Chapter 3: 3.1

Unit – III : Chapter: 4.1 to 4.4

Unit – IV : Chapter 5 : 5.1 & 5.2

Unit – V : Chapter 6: 6.1 & 6.2 and Chapter 8: 8.1

Reference Books:

1. F. Harary, *Graph Theory* ,4th Edition, Addison-Wesley Publishing company
2. Murugan M., *Graph Theory & Algorithms*, Muthali Publishing House, Chennai.
3. Narsingh Dao, *Graph Theory and Applications*.

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CBCS

DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2017- 2018 Batch onwards)

Allied Mathematics for Computer Science & B.C.A Major

Title of the Paper : Numerical Methods

Semester : IV

Contact : 5 hours

Subject Code : 17AMS4/17AMJ4

Credits : 5

Objective:

This subject gives a complete procedure for solving problems, with computer applications basic concepts in Numerical Methods.

Unit- I:

Theory of Equations: Introduction- Formation of Equations - Relation between Roots and Coefficients - Reciprocal Equations-Transformation of Equations

Unit- II:

Curve Fitting : Introduction -Linear Law-Method of Group Averages-Method of Moments-Method of Least squares.

Unit- III:

Algebraic and Transcendental Equations: Iterative method - Bisection method- - Regula Falsi Method (No derivation of formula required)- Newton Raphson Method

Unit- IV

Simultaneous Equations: Back substitution- Gauss Elimination Method -Gauss Jordan Elimination method - Calculation of Inverse of a Matrix -Gauss Seidel Iteration Method. (Problems only).

Unit- V

Interpolation: Newton's Interpolation Formulae-Central difference Interpolation Formulae-Lagrange's Interpolation Formula-Inverse Interpolation (Problems only).

Text Book:

1. S.Arumugam, A.Thangapandi Issac, A. Somasundaram, *Numerical Methods*, II-Edition, Scitech Publications Pvt. Ltd., Chennai, 2009.

Unit – I : Chapter 1: 1.1 to 1.5

Unit – II : Chapter 2: 2.0 to 2.4

Unit – III :Chapter 3: 3.2 to 3.5

Unit – IV :Chapter 4: 4.1 to 4.5 & 4.8

Unit – V : Chapter 7: 7.0 to 7.3 &7.6

Reference Books:

1. Kanda Samy P., Thilagavathy K. & Gunavathy K., *Numerical Methods*, Second Revised Edition, Sultan Chand & Company Ltd., 1999.
2. Singaravelu A., *Numerical Methods*, First Edition, Meenakshi Publications, 2001.
3. Venkataraman M.S., *Numerical Methods in Science and Engineering*, National Publishing Company, 2001.

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Year	Sub Code	Title of the Paper	Lecturer hours per week	Exam hrs	Mark Alloted
II	17MD1	Diploma Course in Operations Research	2	3	100
	17MDP	Practical-II	1	3	100

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CBCS

DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 Batch onwards)

Title of the paper : Diploma Course in Operations Research

Sub Code : 17MD1

Non Semester

Contact : 2 hours

Objectives :

1. To study the Simplex and Dual simplex method.
2. To study the applications of Sequencing problem and Inventory control

Unit I

The computational procedure - Uses of Artificial Variable

Unit II

Sequencing problem: Problems of sequencing – Processing n Jobs through two machines
– Processing n Jobs through k machines – Processing 2 Jobs through k machines.

Unit III

Inventory control - I – factors affecting inventory control-An inventory control problem –
The concept of EOQ –Deterministic Inventory Problems with no Shortages

Unit IV

Inventory control – I –Deterministic Inventory Problem with Shortages-Problems of EOQ with price Breaks.

Unit V

Multi – Item deterministic Problems –Dynamic Order Quantity

Text book: -

Kanti Swarup, P.K.Gupta, Man Mohan, *Operations Research* Sultan Chand & Sons, Educational Publishers, New Delhi, 2016

Unit – I : Chapter 4: 4.3 & 4.4

Unit – II : Chapter 12:12.2 & 12.3 to 12.6

Unit – III : Chapter 19: 19.7 to 19.10

Unit – IV : Chapter 19: 19. 11 & 19.12

Unit – V : Chapter 19: 19.13 & 19.14

Reference Books:-

1. Arumugam S. & Thangapandi Isaac A., *Topics in Operations Research: Linear Programming*, New Gamma Publishing House, Palayamkottai, June 2012.
2. Gupta P.K. & Man Mohan, *Problems in Operations Research*, Sultan Chand & Sons, Delhi, 2003.
3. Sharma J.K., *Operations Research Theory and Applications*, Macmillan Publishers India Ltd., 4th Edition, 2010.

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DEPARTMENT OF MATHEMATICS-UG

(w.e.f. 2017- 2018 Batch onwards)

Title of the paper : Practical II - Diploma Course in Operations Research

Sub Code : 17MDP

Non Semester

Contact : 1 hour

Objective:

To provide the practical, Knowledge of Operations Research by solving several problems

Problems

1. Simplex Method of solving a LPP-Problem1.
2. Simplex Method of solving a LPP-Problem2.
3. Charne's Method of penalty(Big M Method)
4. Economic Order Quantity
5. Problem of EOQ with Finite Replenishment.
6. Deterministic Inventory problem with Shortages
7. Problems of EOQ with Price Breaks
8. Problem of EOQ with Warehouse Capacity
9. Sequencing Problem 1:Processing n Jobs through two machines.
10. Sequencing Problem 1:Processing n Jobs through k machines.
11. Sequencing Problem 1:Processing 2 Jobs through k machines.
12. Inventory Problems

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CBCS

DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 Batch onwards)

Question Pattern for

UGC Sponsored Career Oriented Courses

On

Operations Research

Duration : 3 hrs Maximum Marks : 100

Part – A

I. Answer all the Questions: (25 x 2 = 50 marks)

Fill in the blanks /Choose

Part – B

II. Answer any Five Questions out of Eight Questions : (5 x 10 = 50marks)

(At least one question and at most 2 questions from each unit)

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DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 Batch onwards)

Practical

UGC Sponsored Career Oriented Courses

On

Operations Research

Duration : 3 hrs Maximum Marks : 100

I. Internal - 40
II. External - 60

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Title of the paper	: Modern Analysis	
Semester	: V	Contact Hours : 5
Sub Code	:17M51	Credits : 5

Objectives:

1. To visualize the structure of Real number system as a Metric space.
2. To study connected subsets and Compact subsets of \mathbb{R} .

Unit : I Countable Sets - Uncountable Sets – Inequalities of Holder and Minkowski - **Metric Spaces** -Definitions and Examples – Bounded Sets in a Metric space - Open Ball in a Metric Space – Open Sets – Subspace - Interior of a set .

Unit : II Closed Sets – Closure - Limit Point - Dense Sets – **Complete Metric Spaces**- Completeness - Baire's Category Theorem.

Unit : III Continuity – Continuity - Homeomorphism – Uniform Continuity.

Unit : IV Connectedness - Definition and Examples - Connected Subsets of \mathbb{R} - Connectedness and Continuity

Unit :V Compactness –Compact Metric Space- Compact Subsets of \mathbb{R} – Equivalent Characterization For Compactness - Compactness and Continuity.

Text Book: -

1. S. Arumugam & A.Thangapandi Isaac, *Modern Analysis*, New Gamma Publishing House, Palayamkotai, (2012).

Chapters:-

- Unit – I : Chapter 1: Sections (1.2 to 1.4)
Chapter 2: Sections (2.1 to 2.6)
- Unit – II : Chapter 2: Sections (2.7 to 2.10)
Chapter 3: Sections (3.1 & 3.2)
- Unit – III : Chapter 4: Sections (4.1 to 4.3)
- Unit – IV : Chapter 5: Sections (5.1 to 5. 3)
- Unit – V : Chapter 6: Sections (6.1 to 6.4)

Reference Books:-

1. Chandrasekhara Rao K., & Narayanan K.S., *Real Analysis–Volume II*, Viswanathan Printers, 2008.
2. Richard R. Goldberg, *Methods of real Analysis*, Oxford & IBH Publishing Co. PVT. LTD., (1970).
3. Prof. Venkatachalapathy, S.G.,M.Sc., *Real Analysis*, Margham Publications, 2nd Edition, 2006.

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1. To provide the fundamental knowledge in Statistics.

2. To understand the applications of Statistics

Unit : I Moments, Skewness and Kurtosis: Moments – Skewness – Kurtosis – Curve Fitting – Principle of least squares – Fitting a Straight Line – Fitting a Second Degree Parabola.

Unit :II Correlation and Regression: Correlation – Rank Correlation – Regression – Correlation Co-Efficient for a Bivariate Frequency Distribution.

Unit :III Theory of Attributes: Theory of attributes – Attributes- Consistency of data – Independence and Association of data.

Unit – IV Index Number: Index Numbers – Aggregate Method – Average of Price Relatives Method – Weighted aggregative Method – Weighted Average of Price Relative Method – Consumer Price Index Number (cost of living index numbers).

Unit – V Probability: Probability – Conditional Probability.

Text Book: -

Statistics S. Arumugam and A. Thangapandi Isaac,
New Gamma Publishing House, Palayamkottai (July 2011)

Chapters:-

Unit I : Chapter 4 : Sections (4.1 to 4.2)

Chapter 5 : Section (5.1)

Unit II : Chapter 6 : Sections (6.1 to 6.4)

Unit III : Chapter 8 : Sections (8.1 to 8.2)

Unit IV : Chapter 9 : Sections (9.1 to 9.2)

Unit V : Chapter 11 : Sections (11.1 to 11.2)

Reference Books :-

1. Dr. Gupta S.P., *Statistical methods*, Sultan Chand & Sons Educational Publishers, New Delhi, (2008).
2. Pillai R.S.N., & Bagavathi V., *Statistics*, 7th Edition, S. Chand and Company Ltd., (2014).
3. Veerarajan T., *Probability, Statistics and Random Processes*, Tata McGraw Hill Education Pvt Ltd., 3rd Edition.

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Title of the paper	: Dynamics	
Semester	: V	Contact Hours : 4
Sub Code	: 17M53	Credits : 4

Objective:

To facilitate the ability to analyze the path of a moving particle under specific conditions.

Unit : I Projectiles – Definitions – Two fundamental principles – Path of a Projectile is a parabola – Characteristics of the motion of a projectile - To determine when the horizontal range of a projectile is maximum, given the magnitude u of the velocity of projection – To show that, for a given initial velocity of projection there are, in general to possible directions of projections so as to obtain a given horizontal range.

(with examples)

Unit : II Projectiles -To find the velocity of the projectile in magnitude and direction at the end of time t – To show that , The velocity at any point p of a projectile is equal in magnitude to the velocity acquire in falling freely from the directrix to the point – Given the magnitude of the velocity of projection, to show that there are two direction of projection for the particle so as to reach a given point – Range on an inclined plane – To find , The greatest distance of the projectile from the inclined plane and show that is attained in the half the total time of flight – To determine when the range on the inclined

plane is maximum, given the magnitude u of the velocity of projection – To show that, For a given initial velocity of projection, there are, in general, two possible directions of projection so as to obtain a given range on an inclined plane – Motion on the surface of a smooth inclined plane.(with examples)

Unit :III Collision of Elastic Bodies – Definitions – Fundamental laws of impact – Impact on the smooth sphere on a fixed smooth plane – Direct impact of two smooth spheres – Laws of kinetic energy due to direct impact of two smooth spheres – Oblique impact of two smooth spheres – Laws of kinetic energy due to oblique impact of two smooth sphere.(with examples)

Unit : IV Simple Harmonic Motions – Simple Harmonic Motion in a Straight line – General solution of S.H.M Equation – Geometrical Representation of a Simple Harmonic Motion – Change of origin - Composition of two Simple Harmonic Motion of the same period and in same straight line – Composition of two Simple Harmonic Motion of the same period in two perpendicular directions.(with examples)

Unit : V Motion Under The Action Of Central Forces – Velocity and Acceleration in Polar Co-ordinates – Equation of Motion in Polar Coordinates – Note on the equiangular spiral – Differential Equation of central orbits – Perpendicular from the pole on the tangent formulae in polar coordinates – Pedal equation of the central orbit. (with examples)

Text Book:-

M.K. Venkatarama, *Dynamics*, 13th Edition, Agasthiar Publications (2010).

Chapters:-

Unit I : Chapter 6 : Sections (6.1 to 6.5 & 6.7,6.8) (with examples)

Unit II : Chapter 6 : Sections (6.9 to 6.16)(with examples)

Unit III: Chapter 8 : Sections (8.1 to 8.8)(with examples)

Unit IV: Chapter 10: Sections (10.1 to 10.7)(with examples)

Unit V : Chapter 11: Sections (11.4 & 11.6 to 11.8)(with examples)

Reference Books:-

1. Khanna M.L., *Dynamics*, 7th Edition, Jai Prakash Nath & Co, Garth Road, Meerut.
2. Ramsey A.S., *Dynamics Part I* (First Indian Edition - 1985), CBS Publishers & Distributors, (2002).
3. Venkatachalapathy S.G . *Mechanics*, Margham Publications, (2007).

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Title of the paper	: Linear Algebra	
Semester	: V	Contact Hours :4
Sub Code	:17ME5A	Credits :4

Objective :

To enable the students to understand and apply the different concepts and methods in vector space.

Unit: I Vector Spaces: Definition and Examples – Subspaces - Linear Transformations.

Unit: II Vector Spaces: Span of a set - Linear Independence - Basis and Dimension - Rank and Nullity - Matrix of a Linear Transformation.

Unit: III Inner Product Space: Definition and Examples – Orthogonality -Orthogonal Complement.

Unit: IV Theory of Matrices: Algebra of Matrices – Types of Matrices – Inverse of Matrix.

Unit: V Theory of Matrices: Elementary Transformations – Rank of a Matrix– Simultaneous Linear Equations – Characteristic Equation And Cayley Hamilton Theorem - Eigen Values And Eigen Vectors

Text Book: -

1. S. Arumugam & A .Thangapandi Isaac, *Modern Algebra*, SCITECH Publications (INDIA) Pvt. Ltd., (2003).

Chapters:-

Unit I: Chapter 5: Sections (5.1 to 5.3)

Unit II: Chapter 5: Sections (5.4 to 5.8)

Unit III: Chapter 6: Sections (6.1 to 6.3)

Unit IV: Chapter 7: Sections (7.1 to 7.3)

Unit V: Chapter 7: Sections (7.4 to 7.8)

Reference Books :-

1. Krishnamurthy.V & Arora J.L, *Linear Algebra*, Affiliated East- West Press PVT. LTD., 1976.
2. Schaum's Outlines, *Linear Algebra*, TATA Mcgraw-Hill Edition, 2012.
3. Stephen H. Friedberg, Arnold J. Insel, Lawrence & E. Spence, *Linear Algebra*, Prentice – Hall of India Private Limited, 2004.

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(w.e.f. 2017- 2018 Batch onwards)

Title of the paper	: Fuzzy Sets	
Semester	: V	Contact Hours :4
Sub Code	: 17ME5B	Credits :4

Objective :

1.To Introduce the basic ideas of Fuzzy Mathematics.

Unit :I Crisp sets and Fuzzy sets - Introduction - Crisp sets - The notation of Fuzzy sets-basic concepts of fuzzy sets- classical logic- fuzzy logic

Unit : II Operations on Fuzzy Sets -General discussion -fuzzy complement- fuzzy union - fuzzy intersection - combinations of operations - general aggregation operations.

Unit :III Fuzzy relations - Crisp and fuzzy relations - binary relations - binary relations on a single set - equivalence and similarity relations.

Unit :IV Compatibility or tolerance relations - Orderings.

Unit : V Morphisms - fuzzy relation equations.

Text Book: –

1. George J.Klir and T.A. Folger, *Fuzzy Sets , Uncertainty and Information*, Prentice Hall of India, (2012).

Chapters:

- Unit I: Chapter 1: Sections (1.1 to 1.6)
- Unit II: Chapter 2: Sections (2.1 to 2.6)
- Unit III: Chapter 3: Sections (3.1 to 3.4)
- Unit IV: Chapter 3: Sections (3.5 and 3.6)
- Unit V: Chapter 3: Sections (3.7 and 3.8)

Reference Books:-

1. Dr. Bhargava A.K., *Fuzzy Set Theory Fuzzy Logic and Their Applications*, S.Chand & Company Pvt. Ltd., (2013).
2. George J.Klir & Bo Yuan, *Fuzzy sets Fuzzy Logic, Theory and Applications*, Prentice Hall of India, (2002).

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B.Sc. MATHEMATICS
(w.e.f. 2017- 2018 Batch onwards)

Title of the paper	: Programming in C	
Semester	: V	Contact Hours :4
Sub Code	: 17AA51	Credits :4

Objectives:

1. To study about Fundamentals of C and concepts like
Function, Array, Pointers, Structures and Unions.
2. To study about Data files in C.

Unit :I Overview of C- Constant, Variable and Data Types.

Unit : II Operators and Expressions-Decision Making and Branching

Unit :III Arrays-Character Arrays and Strings

Unit:IV User-defined Functions

Unit : V Structures and Unions –Pointers

Text Book:-

1. E. Balagurusamy, *Programming in Ansi C, 5th Edition*,
Tata Mc Graw-Hill Publishing Company Limited (2011).

Chapters:-

- Unit – I : Chapter 1: Sections (1.1 to 1.12)
Chapter 2: Sections (2.1 to 2.14)
- Unit – II : Chapter 3: Sections (3.1 to 3.16)
Chapter 5: Sections (5.1 to 5.9)
- Unit – III : Chapter 7: Sections (7.1 to 7.9)
Chapter 8: Sections (8.1 to 8.10)
- Unit – IV : Chapter 9: Sections (9.1 to 9.20)
- Unit – V : Chapter 10: Sections (10.1 to 10.14)
Chapter 11: Sections (11.1 to 11.17)

Reference Books :-

1. Ananthi Sheshasaayee & Sheshasaayee G., *Programming Language C with Practicals*, Second Edition, Margham Publications, (2005).
2. Byron Gottfried S., *Programming with C*, 2nd Edition, Tata Mc Graw-Hill Publishing Company Limited, (2006).
3. Ramaswamy S. & Radha Ganesan P., *Programming in C*, 1st Edition, SCITECH Publications (INDIA) PVT. LTD., (2005).

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Title of the paper	: Programming in C (Practical)	
Semester	: V	Contact Hours :2
Sub code	: 17AA5P	Credit :1

Objective:

To gain practical knowledge of C Language by writing and executing several programs.

List of Programs:-

1. Write a program to calculate simple interest Compound interest.
2. Write a program to find the greatest number among 3 numbers.
3. Write a program to calculate the salesman commission

Amount of sales :	10,000	15,000	More than 15,000
Commission :	5%	8%	10%
4. Write a Program to check a given number is Armstrong .
5. Write a program to reverse a given digit (atleast 5 digit number)
6. Write a program to reverse the given string-checking Palindrome
7. Write a program to find the sum of the digits.

8. Write a program to find the ${}^n C_r$ values using functions.
9. Write a program to sort the numbers in Ascending order
(Descending order) .
10. Write a program to add the given two matrices (for three dimensional array)
11. Write a program to maintain the employee details using structure.
12. Write a program using pointers.

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Title of the paper	: Complex Analysis	
Semester	: VI	Contact Hours :6
Sub code	: 17M61	Credit :5

Objective:

1. Enabling to visualize the algebraic structure of Complex number system.
2. To facilitate to develop problem solving skills in Complex Integration.

Unit : I Complex Numbers – Conjugation and Modulus- Inequalities – Square Root – Geometrical Representation of Complex Numbers – n^{th} Roots of Complex Numbers – Circles and Straight Lines – Regions in the Complex Plane

Unit : II Functions of a Complex Variable- Limits – Theorems on Limit – Continuous Functions – Differentiability – The Cauchy - Riemann Equations – Analytic Functions - Harmonic Functions.

Unit: III Bilinear Transformations –Invariant Points - Cross Ratio – Special Bilinear Transformation (i) which map real axis to real axis – (ii)Unit circle to unit circle – (iii)Real axis to unit circle.

Unit: IV Complex Integration - Cauchy's Integral Theorem – Extensions of Cauchy's Integral Theorem- Cauchy's integral formula - Derivatives of analytic functions

- Morera's Theorem - Cauchy's inequality for $f^n(z_0)$ - Liouville's Theorem - Fundamental Theorem of Algebra - Maximum modulus theorem - Taylor's theorem - Laurent's theorem

Unit : V Singular points – Essential Singularity – Meromorphic function – Principle of the Argument - Rouché's theorem – Fundamental Theorem of Algebra - Evaluation of Residue at a pole – Residue Theorem – Evaluation of Definite Integrals.

Text Books: -

1. S. Arumugam, A. Thangapandi Issac & A. Somasundaram,
Complex Analysis, New Gamma Publishing House, Palayamkottai, (1999).

Unit I : Chapter 1 : Sections (1.1 to 1.8)

Unit II : Chapter 2 : Sections (2.1 to 2.8)

2. S. Narayanan & T.K. Manicavachagom Pillay, *Complex Analysis*,
S. Viswanathan (Printers and Publishers), PVT. LTD., (1994).

Unit III: Chapter 2 : sections(2.1 to 2.7)

Unit IV: Chapter 3 : sections (3.1 to 3.12)

Chapter 4 : sections (4.1 to 4.2)

Unit V: Chapter 4 : sections (4.3, 4.3.1, 4.4.1, 4.4.2, 4.4.3, 4.5.1 to 4.5.5)

Chapter 5 : sections (5.1 to 5.5)

Reference Books:

1. Duraipandian P, Laxmi Duraipandian & Muhilan D. *Complex Analysis*, Emerald Publishers, 1976.
2. Manicavachagom Pillay T.K., Dr. Rajagopalan S.P. & Dr. Sattanathan R., *Complex Analysis*, S. Viswanathan (Printers & Publishers) Pvt. Ltd., (2007).
3. Venkatachalapathy S.G., *Complex Analysis*, Margham Publications, (2006).

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(w.e.f. 2017 - 2018 Batch onwards)

Title of the paper	: Statistics -II	
Semester	: VI	Contact Hours : 6
Sub code	: 17M62	Credits : 5

Objective :

1. To study the some special distribution like Binomial, poisson and normal distribution.
2. To study the Test of significance (Large samples, small samples).

Unit:I Random Variables: Discrete Random Variables – Continuous Random Variables - Mathematical Expectations – Moment Generating Functions-Characteristic Function.

Unit :I Some special distributions: Binomial Distributions – Poisson Distributions-Normal Distributions –Some More Continuous Distributions (Gamma distribution ,Chi Square distribution , Student's –t distribution, Snedecor's-F distribution and Fischer's, Z- distributions).

Unit : III Test of significance (Large samples): Sampling – Sampling Distribution – Testing of Hypothesis – Procedure for Testing of Hypothesis for Large Sample.

Unit : IV Test of Significance (Small samples): Test of significance based on t-distribution(t- test) – Test for significance based on F-test – Test for significance of an observed sample Correlation.

Unit : V Test based on χ^2 - distribution: χ^2 –Test- χ^2 –Test to test the goodness of fit- Test for independence of Attributes. **Analysis of variance:** One criterion of classification- two criteria of classification-Three criteria of Classification Latin squares.

Text Book:-

1. S. Arumugam & A. Thangapandi Isaac, *Statistics*, New Gamma Publications Pvt. Ltd., (July 2011).

Chapters:-

- Unit I : Chapter 12 : Sections (12.1 to 12.6)
- Unit II : Chapter 13 : Sections (13.1 to 13.4)
- Unit III : Chapter 14 : Sections (14.1 to 14.5)
- Unit IV : Chapter 15 : Sections (15.1 to 15.3)
- Unit V : Chapter 16 : Sections (16.1 to 16.3)
- Chapter 17 : Sections (17.1 to 17.3)

Reference Books: -

1. Dr. Gupta S.P., *Statistical Methods*, Sultan Chand & Sons Educational Publishers, New Delhi, (2008).
2. Pillai R.S.N. & Bagavathi V., *Statistics*, 7th Edition, S.Chand and Company LTD., (2014).
3. Sankara Narayanan T., Joseph A. Mangaladoss, *Statistics and Its Applications* Presi and Presi Publications, (1992).

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Title of the paper	: Numerical Methods	
Semester	: VI	Contact Hours :6
Sub Code	: 17M63	Credits : 4

Objective :

To study Numerical method Problems Such as Algebraic and Transcendental equations, Simultaneous equations, Finite differences Interpolation formulae and Numerical differentiation and Integration.

Unit : I Algebraic and Transcendental Equations - Introduction - Iteration Method - Bisection Method – Regula Falsi method -- Newton- Raphson Method . **Simultaneous Equations** –Back substitution - Gauss Elimination Method – Gauss Jordan Elimination Method – Iterative methods- Gauss Jacobi Iteration Method – Gauss- Seidal Iteration Method .

Unit : I I Finite Differences –Difference operators-Forward Differences - Backward Differences – Central difference operators - Other Difference operators.

Unit : III Interpolation - Newton's Interpolation Formula - Lagrange's Interpolation formula - Divided Differences - Newton's Divided differences formula – Inverse Interpolation.

Unit : IV Numerical Differentiation and Integration – Derivatives using Newton's forward difference formula – Derivatives using Newton's backward difference

formula - Derivatives using central difference formula – Maxima and minima of the interpolating polynomial – Numerical integration – Newton-Cote’s quadrature formula - Trapezoidal rule - Simpson’s one third rule - Simpson’s three eight rule.

Unit : V **Numerical Solutions of Ordinary Differential Equations** – Taylor’s Series Method – Picard’s Method - Euler’s Method – Runge-Kutta Methods .

Text Book: -

1. S. Arumugam, A.Thangapandi Isaac & A.Somasundaram, *Numerical Methods*, Second Edition, Scitech Publications (India) Pvt. Ltd., (2015).

Chapters:-

- Unit I : Chapter 3 : Sections (3.1 to 3.4)
 Chapter 4 : Sections (4.1 to 4.4 & 4.7, 4.8)
- Unit II : Chapter 6 : Sections (6.1 & 6.2)
- Unit III : Chapter 7 : Sections (7.1 & 7.3 to 7.6)
- Unit IV : Chapter 8 : Sections (8.1 to 8.5)
- Unit V : Chapter 10: Sections (10.1 to 10.4)

Reference Books: -

1. Kandasamy.P., Thilagavathy.K, K.Gunavathy *Numerical Methods*, Second Edition, Sultan Chand & Company Ltd, 2003.
2. Sastry. S.S. *Introductory methods of Numerical Analysis*.Prentice Hall of Pvt. Ltd., 1988.
3. Venkataraman. M.K., *Numerical methods in Science and Engineering* National Publishing Company, 2000.

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

(An Autonomous Institution – Affiliated to Madurai Kamaraj University)

(Re-accredited (3rd Cycle) with Grade A⁺ & CGPA 3.51 by NAAC)**CBCS****DEPARTMENT OF MATHEMATICS****B.Sc. MATHEMATICS**

(w.e.f. 2017 - 2018 Batch onwards)

Title of the paper	: Object –Oriented Programming with C++	
Semester	: VI	Contact Hours: 4
Sub code	: 17AA61	Credits : 4

Objective:

1. To study the Basic concepts of OOPS and C++.

Unit :I Beginning with C++ - Tokens - Expressions and Control structures.

Unit: II Functions in C++ - Classes and Objects.

Unit: III Constructors and Destructors – Operator overloading and data type conversions.

Unit : IV Inheritance - Extending classes - Pointers .

Unit : V Virtual functions and Polymorphism - Managing console I/O operations – working with files.

Text Book:-

1. E. Balagurusamy, *Object Oriented Programming with C++*, 4th Edition, Tata McGraw-Hill Publishing Company Limited, (2004).

Chapters:-

Unit I : Chapter 2 : Sections (2.1 to 2.6)

Chapter 3 : Sections (3.1 to 3.24)

Unit II : Chapter 4 : Sections (4.1 to 4.11)

Chapter 5 : Sections (5.1 to 5.16)

Unit III : Chapter 6 : Sections (6.1 to 6.11)
 Chapter 7 : Sections (7.1 to 7.8)
Unit IV : Chapter 8 : Sections (8.1 to 8.12)
 Chapter 9 : Sections (9.1 to 9.5)
Unit V : Chapter 9 : Sections (9.6 to 9.7)
 Chapter 10 : Sections (10.1 to 10.6)
 Chapter 11 : Sections (11.1 to 11.10)

Reference Books :-

1. Herebert Schildt, *The Complete Reference C++*, IV Edition, Tata McGraw-Hill Publishing Company Limited.
2. Radha Ganesan P., *Programming with C++*, SCITECH Publications (INDIA) PVT. LTD., (2002).
3. Ravichandran D., *Programming with C++*, Second Edition, Tata McGraw-Hill Publishing Company Limited, (2008).

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Title of the paper	: C++ - Practical	
Semester	: VI	Contact Hours : 2
Sub Code	: 17AA6P	Credit : 1

Objective:

Facilitated to have practical experience of the theory part in C++

List of Programs: -

1. Write a Program to convert Fahrenheit value into Celsius and Vice versa.
2. Write a Program to Calculate S .D . and Variance.
3. Write a Program to print the following output using for loops

2	2
3	3 3
4	4 4 4 4 & so on.
4. Write a Program to check a given string is palindrome
5. Write a Program to find the Factorial of given number using function.
6. Write a Program to find the largest value of two numbers using nesting of member functions.

7. Write a Program using member function for addition and multiplication.
8. Write a Program to maintain library details using constructor and destructor.
9. Write a Program to maintain student's mark details using array within class.
10. Write a Program to maintain Employee Details using array of objects.
11. Write a Program to add complex numbers using Operator overloading
12. Write a Program to implement multiple inheritances for employer's details.
13. Write a Program to implement multilevel inheritance.
14. Write a Program using object as pointer for displaying student's results.

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To understand the concept in Vector differentiation and integration.

Unit:I Differentiation of vectors-Gradient.**Unit: II** Divergence and Curl – Solved problems.**Unit : III** Directional derivative – Solenoidal - Irrotational vectors.**Unit : IV** Line integral –Surface integral(without problems)**Unit – V** Theorems of Green, Gauss and Stoke's theorem (without proof)

Simple applications.

Text Book: -

1. S. Arumugam and A . Thangapandi Isaac, *Calculus* Volume – II (Chapter – III), New Gamma Publishing House, Palayamkottai, (2003).

Chapters:-

- Unit – I : Chapter 7: Sections (7.2 & 7.3)
Unit – II & III : Chapter 7: Section 7.4
Unit – IV : Chapter 8: Sections (8.1 & 8.2)
Unit – V : Chapter 8: Section 8.3

Reference Books :-

1. Arumugam .S & Thangapandi Isaac, *Analytical Geometry 3D & Vector Calculus*, New Gamma Publishing House, Palayamkottai, (2011).
2. Gupta .R, *Vector calculus*, Laxmi Publications, New Delhi.

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Title of the paper	: Quantitative Aptitude	Contact Hours	:2
Semester	: V	Credits	:2
Sub code	:17SEM52		

Objective:

To get familiar with short cut techniques to solve Mathematical problems.

Unit :I Problems on Numbers & Problems on Ages

Unit ::II Profit and Loss-Ratio and Proportion

Unit:III Time and Work-Time and Distance

Unit:IV Averages - Probability

Unit:V Permutations and Combinations – Heights & Distance

Text Book :

1. R.S. Aggarwal, *Quantitative Aptitude for Competitive Examinations*, Sultan Chand & Sons Company, (2007).

Chapters:-

Unit-I : Chapter 7 & Chapter 8

Unit-II : Chapter 11 & Chapter 12

Unit-III : Chapter 15 & Chapter 17

Unit-IV: Chapter 6 & Chapter 31

Unit-V : Chapter 30 & Chapter 34

Reference Books:-

1. Abhijit Guha, *Quantitative Aptitude*, Tata McGraw Hill Publishing Company, (2011).
2. Dinesh Knaltar, *Quantitative Aptitude*, Dorling Kindersley (India) Pvt. Ltd., (2008).

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Title of the paper	: Discrete Mathematics	
Semester	: VI	Contact Hours : 2
Sub code	: 17SEM61	Credits : 2

Objective:

To provide the basic knowledge in logic and propositional
Calculus.

Unit :I Introduction- TF statements - Connectives

Unit : II Atomic and compound statements-Well formed (statement) formulae -
Truth table of a formula -Tautology– Tautological Implication and
equivalence of formulae

Unit : III Lattices-Some Properties of Lattices-New Lattice

Unit : IV Modular and Distributive Lattices - Boolean Algebra

Unit : V Recurrence –an introduction –Recurrence Relation – Worked Examples.

Text Book: -

Dr. M.K. Venkatraman, Dr. N. Sridharan & Mr. N. Chandra sekaran

Discrete Mathematics , The National Publishing Company (2009).

Chapter:-

Unit-I : Chapter 9: Sections (9.1 to 9.3)

Unit-II : Chapter 9: Sections (9.4 to 9.8)

Unit-III: Chapter 10: Sections (10.1 to 10.3)

Unit-IV: Chapter 10: Sections (10.4 to 10.5)

Unit-V: Chapter 5: Sections (5.1 to 5.3)

Reference Books: -

1. Ramaswamy V., *Discrete Mathematical Structures with Applications to Combinatorics*, Universities Press (India) Private Limited, (2006).
2. Somasundaram R.M, *Discrete Mathematical Structures*, PHI Learning Private Limited, New Delhi, (2009).

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI-14.**(An Autonomous Institution – Affiliated to Madurai Kamaraj University)****(Re-accredited (3rd Cycle) with Grade A⁺ & CGPA 3.51 by NAAC)****CBCS****DEPARTMENT OF MATHEMATICS****B.Sc. MATHEMATICS****(w.e.f. 2017- 2018 Batch onwards)****Skill-Based Elective**

Title of the paper	: Combinatorics	
Semester	: VI	Contact Hours :2
Sub code	: 17SEM62	Credits :2

Objective: To introduce Combinatorial techniques for solving enumeration problems

- Unit:I** The Rules of Sum and Product
- Unit: II** Permutations - Combinations - Permutations and Combinations with Repetitions
- Unit :III** The Binomial Theorem - Pascal's Identity - Vander Monde's Identity
- Unit :IV** The Multinomial Theorem - Ramsey Number
- Unit : V** The Catalan Numbers - Stirling Numbers and Bell Numbers.

Text Book :-

1. C. Vasudev, *Theory and Problems of Combinatorics*, New Age International Publishers, (2008).

Chapters:-

- Unit I: Chapter 1: Section 1.1
- Unit II: Chapter 1: Sections (1.2 to 1.4)

Unit III: Chapter 1: Section 1.5

Unit IV: Chapter 1: Sections (1.5 to 1.6)

Unit V: Chapter 1: Sections (1.7 to 1.8)

Reference Books:-

1. APTE D.P, *Probability And Combinatorics*, Excel Books, (2007).
2. David A. Santos, *Probability An Introduction* (Chapter-2), Jones and Bartlett India Pvt. Ltd., First Indian Edition, (2011).

E.M.G.YADAVA WOMEN'S COLLEGE, MADURAI-14.**(An Autonomous Institution – Affiliated to Madurai Kamaraj University)****(Re-accredited (3rd Cycle) with Grade A⁺ & CGPA 3.51 by NAAC)****CBCS****DEPARTMENT OF MATHEMATICS - UG****(w.e.f. 2017- 2018 onwards)****Operations Research****UGC - Sponsored Career Oriented Course**

Year	Sub Code	Title of the Paper	Lecturer hours per week	Exam hrs	Mark Alloted
III	17MAD1	Advanced Diploma Course in Operations Research	2	3	100
	17MADPR	Project	1		100

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DEPARTMENT OF MATHEMATICS

B.Sc. MATHEMATICS

(w.e.f. 2017- 2018 Batch onwards)

Title of the paper : Advanced Diploma Course in Operations Research

Sub Code : 17MAD1

Non Semester

Contact Hours: 2

Objectives :

1. To study the techniques of Network Scheduling
2. To study the applications of Decision Analysis

Unit: I Network Scheduling by PERT/CPM:

Introduction – Basic Components – Logical Sequencing – Rules of Network Construction – Concurrent Activities – Critical Path Analysis.

Unit :II Decision Analysis:

Introduction – Decision making Problem - Decision making Process - Decision making Environment - Decision under uncertainty.

Unit :III Inventory Control - II:

Introduction – Inventory Problems with uncertain demand – systems of Inventory Control. (simple problems only)

Unit :IV Queueing Theory:

Introduction – Queueing System – Elements of a Queueing System –
Operating Characteristics of a Queueing System – Deterministic Queueing System –
Probability Distributions in Queueing System – Classification of Queueing Models -
Definition of Transient and Steady states.

Unit :V Poisson Queueing Systems (Model 1, 2, 3 & 4)

Text book:-

1. Kanti Swarup, P.K.Gupta & Man Mohan, *Operations Research*, Sultan Chand & Sons Educational Publishers, New Delhi, (2011).

Chapters:-

- Unit I: Chapter 25: Sections (25.1 to 25.6)
- Unit II: Chapter 16: Sections (16.1 to 16.5)
- Unit III: Chapter 20: Sections (20.1 to 20.3)(Simple Examples)
- Unit IV: Chapter 21: Sections (21.1 to 21.8)
- Unit V: Chapter 21: Sections (21.9)

Reference Books:-

1. Arumugam S. & Thagapandi Isaac A., *Topics in Operations Research:Linear programming*, June 2012, New Gamma Publishing House, Palayamkottai, (2003).
2. Gupta P.K. & Man Mohan, *Problems in Operations Research*, Sultan Chand & Sons, Delhi, (2003).
3. Sharma J.K, *Operations Research Theory and Applications*, Macmillan Publishers India Ltd., 4th Edition, (2010).

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DEPARTMENT OF MATHEMATICS

B.Sc. MATHEMATICS

(w.e.f. 2017 – 2018 Batch onwards)

Title of the paper : Project - Advance Diploma Course In Operations Research

Sub Code : 17MADPR

Non Semester

Contact Hours : 1

Objective:-

To Provide the practical knowledge about the Operation Research by solving several problems.

Project Report -80 marks

Viva Voce -20 marks

Total -100 marks

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DEPARTMENT OF MATHEMATICS - UG

(w.e.f. 2017- 2018 Batch onwards)

Question Pattern for

UGC Sponsored Career Oriented Courses

On

Operations Research

Duration : 3 hrs

Maximum Marks : 100

Part – A

I. Answer all the Questions:

(25 x 2 = 50 marks)

Fill in the blanks /Choose

Part – B

II. Answer any Five Questions out of Eight Questions: (5 x 10 = 50marks)

(At least one question and at most 2 questions from each unit)