

**ST. JOSEPH'S COLLEGE OF ARTS & SCIENCE (AUTONOMOUS)  
CUDDALORE-1**

**PG & RESEARCH DEPARTMENT OF MATHEMATICS  
BOARD OF STUDIES (2018-2019)  
March 2019**

**BOARD OF STUDIES REPORT  
BOARD OF STUDIES MEETING - (2018-2019)**

PG and Research Department of Mathematics conducted Board of Studies Meeting on 11-03-2019 at 11.30 am to discuss about syllabi for UG, PG and M.Phil. courses.

Syllabi for UG, PG and M.Phil. courses were already framed by the faculty members and the same is brought to the notice of the board members, the Chairman, University Nominee.

**UG Board:**

The following members discussed on the syllabi for UG Course,

Chairman:

**Dr. J. Jon Arockiaraj**, M.Sc., M.Phil., B.Ed., PGDCA., Ph.D.,  
Head, Department of Mathematics,  
St. Joseph's College of Arts & Science (Autonomous), Cuddalore-1.

University Nominee:

**Dr. S.R. Kannan**, M.Sc., M.Phil., Ph.D.,  
Professor in Mathematics,  
Pondicherry University, Puducherry.  
Ph:9865707773  
Email: srkannan.mat@pondiuni.edu.in

Subject Expert:

**Dr. G. Rajasekar**, M.Sc., M.Phil., Ph.D.,  
Associate Professor in Mathematics,  
Jawahar Science College, Neyveli.  
Ph:9443051420  
Email: grsmaths@gmail.com

Alumni :

**Dr. S. Vijayabalaji**, M.Sc., M.Phil., Ph.D.

Asst. Professor in Mathematics,  
Anna University College of Engineering ,  
Panruti Campus, Panruti.

Ph:9443682630

Email:balaji1977harshini@gmail.com

Members of the Board:

1. Mr. A. Virginraj
2. Mrs. L. Jethruth Emeldamary
3. Mr. A. Venkatesan
4. Mr. A. Rajesh
5. Mrs. R. Padamapriya
6. Ms. M. Kalaimathi
7. Dr. S. Anjal Mose

Core paper syllabus are No Changes and also planned to introduce the following Courses in Fifth Semester. (i) Value Added Courses (ii) E Learning / Department (iii) Self Study Course. And Allied Mathematics-II (AMCS202T) for computer science syllabus changed.

Paper-1: Algebra & Trigonometry- No change

Paper-2: Two Dimensional & Three Dimensional Geometry- Changed

Paper-3: Calculus – No Change

Paper-4: Numerical Methods and Computer Applications- No Change

Paper-5: Differential Equations – No change

Paper-6: Vector and Fourier Analysis – No change

Paper-7: Fuzzy subsets and Applications- No Change

Paper-8: Graph Theory – No change

Paper-9: Abstract Algebra-No change

Paper-10: Real Analysis –I -No Change

Paper-11: Complex Analysis-I -No change

Paper-12: Mechanics-II - Changed

Elective-I- MATLAB – No change

Paper-14: Linear Algebra-No change

Paper-15: Real Analysis –II -No Change

Paper-16: Complex Analysis-II-No change

Paper-17: Programming in C Language and Computer Practical in C Language – No change

Elective-II: Operations Research -No change  
Allied Maths-I (Computer Science): No change  
Allied Maths-I (Physics/Chemistry): No change  
Allied Maths-II (Computer Science): Changed  
Allied Maths-II (Physics/Chemistry): No change  
Mathematical foundations (I -B.C.A)- No change  
Numerical Methods (II -B.C.A)- No change  
Resource Management Techniques (II - B.C.A)-No change  
Business Mathematics (II -B.Com) - No change  
Mathematics for Competitive Exams (II -B.B.M)- No change

**Suggestions:**

1. For the students admitted from the year 2017-2018. The following Papers are changed Paper-12: Mechanics (MT407 -Mechanics I and EMT512S-Mechanics II are merged) it's also passed in Last Board of Studies meeting also, and introduce Value Added Course , E-Learning , Self Study Course
2. For the students Admitted from the 2019-2020 Allied Mathematics-II ( AMCS202T) changed as unit-II (Solving Differential Equation ) and unit-IV (Vector Integration ) are Removed , Unit-I(Game Theory ) and Unit-II(Assignment Model ) are introduced
  - Model question paper along with key should be sent to the question paper setter by the staff of the concerned subjects.
  - If the questions are set by externals, internal experts should scrutinize them.
  - If the questions are from out of syllabus then the scrutinize should be allowed to change the question accordingly with the support of concerned staff.
  - Questions should cover all the units

**B. Sc .MATHEMATICS  
CURRICULUM DESIGN TEMPLATE**

Year/ Sem	Subject	SUB CODE	Title of the paper	Hrs	Credits	Total Credits
<b>I YEAR/ I SEM</b>	Language-I	LT101S	TAMIL/HINDI/FRENCH – I	4	3	23
	English-I	LE101T	ENGLISH – I	4	3	
	Core-I	MT101S	ALGEBRA & TRIGNOMETRY	5	4	
	Core-II	MT102P	ANALYTICAL GEOMETRY AND THREE DIMENSION	6	4	
	Allied-I	18SMT101	ALLIED STATISTICS-I	8	6	
	AEC	19AEC101	ENGLISH COMMUNICATION	1	1	
	SEC	VE101T	VALUE EDUCATION	2	2	
<b>I YEAR/ II SEM</b>	Language-II	LT202T	TAMIL/HINDI/FRENCH – II	4	3	23
	English-II	LE202T	ENGLISH – II	4	3	
	Core-III	MT203S	CALCULUS	6	4	
	Core-IV	MT204S	NUMERICAL METHODS	5	4	
	Allied-II	18SMT202 / 18SMP201	ALLIED STATISTICS II	8	4	
			ALLIED STASTICS –II (PRACTICAL)		2	
	AEC	19AEC202	ENGLISH COMMUNICATION	1	1	
SEC	EPD201T	DYNAMICS OF PERSONALITY	2	2		
<b>II YEAR/ III SEM</b>	Language-III	LT303T	TAMIL/HINDI/FRENCH – III	4	3	23
	English-III	LE303T	ENGLISH – III	4	3	
	Core-V	MT305S	DIFFERENTIAL EQUATIONS	5	4	
	Core-VI	MT306S	VECTOR AND FOURIER ANALYSIS	6	4	
	Allied-III	ACMT301Q	COST & MANAGEMENT ACCOUNTING	8	6	
	SEC	19AOFA31/ EVS301S	FIRSTAID (Shift-II) / EVS (Shift-I)	3	3	
<b>II YEAR/ IV SEM</b>	Language-IV	LT404T	TAMIL/HINDI/FRENCH – IV	4	3	22
	English-IV	LE404T	ENGLISH – IV	4	3	
	Core-VI	MT407S	FUZZY SETS AND ITS APPLICATIONS	6	4	
	Core-VIII	MT408	GRAPH THEORY	5	4	
	Allied-IV	APH401T /	ALLIED PHYSICS	8	4	
			ALLIED PHYSICS (PRACTICAL)		2	
SEC	EVS401S/ 19AOFA41	ENVIRONMENTAL SCIENCE (Shift-II) / FIRST AID (Shift-I)	3	2		

IIIYEAR/ V SEM	Core-IX	MT509	ABSTRACT ALGEBRA	6	5	26
	Core-X	MT510	REAL ANALYSIS –I	6	5	
	CoreXI	MT511	COMPLEX ANALYSIS – I	6	4	
	Elective –I	18EMT512 / EMT512A	MECHANICS / A SPECIAL FUNCTIONS	5	4	
	Elective-II	EMT513S / EMT513A	MAT-LAB / Theory of fuzzy number system	3	2	
		MTP501	PROGRAMMING IN MATLAB	2	2	
	SEC (E-Learning / Dept.)	19SMT51	ARITHMETIC AND QUANTITATIVE APPTITUDE FOR COMPETITATIVE EXMINATION.	2	2	
	SSC (Optional )	19SSMT52	HISTORY OF MATHEMATICS	-	2	
IIIYEAR/ VI SEM	Core-XII	MT614	LINEAR ALGEBRA	6	5	25
	Core-XIII	MT615	REAL ANALYSIS-II	6	5	
	Core-XIV	MT616	COMPLEX ANALYSIS- II	6	5	
	Elective-III	EMT617 S / EMT617A	PROGRAMMING IN C LANGUAGE / MATHEMATICAL MODELING	4	2	
		MTP601	PROGRAMMING IN C LANGUAGE – PRACTICAL	2	2	
	Elective-IV	EMT618S / EMT618A	OPERATIONS RESEARCH / ASTRONOMY	6	4	
Skill		EXTENSION ACTIVITES	-	2		

**TOTAL CREDITS =142**

**Courses offered to other Department**

S. No	Department	Year/Sem	Paper Code	Paper Name	No. Of Hours
1	Physics	I year/ I sem	AMT101Q	Allied Mathematics-I	8
2	Physics	I year/II Sem	AMT202T	Allied Mathematics-II	8
3	Chemistry	I Year/ I Sem	AMT101Q	Allied Mathematics-I	8
4	Chemistry	I year/II Sem	AMT202T	Allied Mathematics-II	8
5	Computer Science	I Year / I Sem	AMCS101T	Allied Mathematics-I	8
6	Computer Science	I Year/ II Sem	19AMCS22	Allied Mathematics-II	8
7	Computer Application	I Year/ I Sem	AMTCA101	Mathematical Foundation	5
8	Computer Application	II Year/III Sem	AMTCA302	Numerical Methods	5
9	Computer Application	II Year/IV Sem	AMCA403S	Resource Management Techniques	5
10	B.Com (Commerce)	II Year/IV Sem	AMCM401	Business Mathematics	5
11	B.Com ( Bank Management)	II Year/ IV Sem	AMBM401	Mathematics for Competitive Exams	5
11	BBA(CA)	II Year/ III Sem	17ABM33	Resource Management Techniques	5
12	Computer Science	I Year / I Sem	PCS701S	Mathematical Foundation for Computer Science	4

<b>I-B.Sc(MATHS)</b>	<b>ALGEBRA AND TRIGONOMETRY</b> <b>For the students admitted from the</b> <b>year 2014</b>	<b>MT101S</b>
<b>SEMESTER-I</b>		<b>HRS/WK – 5</b>
<b>CORE-I</b>		<b>CREDIT – 4</b>

**OBJECTIVES**

The course aim is to introduce the concepts of Theory of Equations, Summation of Series, Matrices and Elementary Number theory.

**Course Outcome:**

At the end of the course students will be able to

CO1: Find the solutions of cubic and polynomial equations.

CO2: Find the summation of varies types of series.

CO3: Find the rank, Eigen valves of matrices & solving homogeneous systems.

CO4: Solve system of linear congruence's and apply Euler-Fermat's, Wilson's theorem to prove relations involving prime numbers.

CO5: Find expansions of trigonometric values and solutions of trigonometric equations.

SEMESTER I	COURSE CODE: MT101S					TITLE OF THE PAPER: ALGEBRA AND TRIGONOMETRY										HOURS: 6	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	4	3	3	4	5	5	2	4	3	5	2	3	4	3.6	
CO2	3	4	3	3	3	4	5	5	2	4	3	5	2	2	4	3.46	
CO3	3	4	4	3	3	4	4	5	2	4	3	5	2	2	4	3.46	
CO4	3	4	4	3	3	4	5	5	2	4	3	5	3	2	4	3.6	
CO5	3	4	3	3	3	4	5	5	2	4	3	5	2	2	4	3.46	
Mean Overall Score															3.5		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} < 1$	$1.1 \leq \text{rating} < 2$	$2.1 \leq \text{rating} < 3$	$3.1 \leq \text{rating} < 4$	$4.1 \leq \text{rating} < 5$
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT - I: THEORY OF EQUATIONS**

Polynomial Equations - Imaginary and Irrational roots – Symmetric Functions of roots in terms of Coefficients – Reciprocal Equations – Transformation of Equations - Descartes Rule of Signs – Approximate Solutions of Polynomials by Horner's method – Newton Raphson method of Solution of a cubic polynomial.

**UNIT -II: SUMMATION OF SERIES**

Binomial - Exponential and Logarithmic series [Theorems without proofs]

**UNIT -III: MATRICES**

Symmetric and Skew symmetric – Hermitian and Skew Hermitian – Orthogonal and Unitary Matrices – rank of Matrix – Consistency and solutions of Linear Systems – Cayley Hamilton Theorem [without proof] – Eigen Values – Eigen Vectors – Similar Matrices – Diagonalisation of Matrix.

**UNIT - IV: ELEMENTARY NUMBER THEORY**

Prime Number – Composite Number – Decomposition of a Composite Number as a Product of Primes uniquely [without proof] – Divisors of a Positive Integer – Congruence Modulo  $n$  – Euler Function [without proof] – Highest Power of a Prime Number  $p$  contained in  $n!$  – Fermat's and Wilson's Theorems (without proof)

**UNIT-V : TRIGONOMETRY**

Expansion of  $\cos n\theta$ ,  $\sin n\theta$  - Expansion of  $\tan n\theta$  in terms of  $\tan\theta$  - Expansion of  $\tan[A+B+C+\dots]$  - solution of trigonometric equations. Powers of sines and cosines of  $\theta$  in terms of functions of multiples of  $\theta$  - Expansions of  $\sin\theta$ ,  $\cos\theta$  and  $\tan\theta$  in a series of ascending powers of  $\theta$  - Hyperbolic and Inverse Hyperbolic functions: Real and Imaginary parts - Inverse Hyperbolic functions.

**TEXT BOOKS:**

1. T.K.Manicavachagom Pillay, T.Natarajan and K.S.Ganapathy [2004], "Algebra", Volume I & II, S.Viswanathans Printers Pvt. Ltd. Chennai.
2. P. Kandasamy, K.Thilagavathy [2004], "Mathematics for B.Sc" ,Volume- I, II, III & IV, S.Chand & Company Ltd., New Delhi-55.

**REFERENCE BOOKS:**

1. S.Arumugam [2003], "Algebra", New Gamma Publishing House, Palayamkottai.
2. A.Singaravelu [2003], "Algebra and Trigonometry", Volume – I &II Meenakshi Agency, Chennai.
3. S.Sudha [1998], "Algebra and Trigonometry", Emerald Publishes, Chennai.

<b>I – B.Sc (Maths)</b>	<b>ANALYTICAL GEOMRTRY OF THREE DIMENSION</b>	<b>MT102P</b>
<b>SEMESTER – I</b>		<b>HRS/WK – 6</b>
<b>CORE – 2</b>		<b>CREDIT – 4</b>
<b>For the students admitted from the year 2018</b>		

**OBJECTIVES:**

To acquire the knowledge of equation on plane ,straight line, sphere, cone and cylinder in the three dimensional space.

**COURSE OUTCOMES:**

The students after undergoing this course will be able to

**CO1:** Understand more about three dimension using planes

**CO2:** Learn straight lines and its symmetrical form problems using straight line

**CO3:** Study more about straight lines using coplanar and shortest distance between the lines

**CO4:** Analyze the concepts associated with spheres and solve problems using sphere

**CO5:** Analyze more about three dimensions using cone and cylinder

SEMESTER I	COURSE CODE: MT102P					TITLE OF THE PAPER: ANALYTICAL GOEMTRY OF THREE DIMENSIONS										HOUR S: 6	CREDITS: 4
COURSE OUTCOME S	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO1	PSO2	PSO 3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	5	5	4	4	3	3	4	4	3	4	3	5	4	3	4	3.87	
CO2	4	4	4	3	3	3	3	3	3	3	3	5	4	2	3	3.3	
CO3	4	4	4	4	2	3	4	4	3	4	3	5	4	2	4	3.6	
CO4	4	4	4	2	2	3	5	3	3	4	2	3	4	2	5	3.3	
CO5	3	4	4	3	3	3	5	3	3	4	2	3	4	2	4	3.3	
Mean Overall Score															3.47		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT - I: PLANES**

General equation – passing through three points – angle between the planes - line of intersection – length of the perpendicular – plane bisecting the angle between the Plane.

**UNIT - II: STRAIGHT LINES**

Symmetrical form – passing through two points – plane and straight line – Angle between the Plane and the Line.

**Unit-III: STRAIGHT LINE (Contd..)**

coplanar lines – shortest distance between two lines – Intersection of three Planes.

**UNIT - IV: THE SPHERE**

Equation of a sphere- length of tangent to the sphere- plane section of spheres- intersection of two spheres- Tangent plane to the sphere

**UNIT - V: CONE AND CYLINDER**

Equation of a cone– Intersection of a straight line and a quadric cone – tangent plane and normal – Cylinder – Right circular cylinder – Equation of an Enveloping cylinder.

**TEXT BOOKS:**

1. T.K.Manicavachagom Pillay & T. Natrajan (2011), "Analytical Geometry, part II-Three Dimensions", S.Viswanathan Printers & Publishers Pvt.Ltd. Chennai.  
Unit-I: Chapter: 2.1 – 2.11,  
Unit-II:Chapter: 3.1 - 3.6  
Unit-III:Chapter:3.7-3.8  
Unit-IV:Chapter: 4.1 – 4.8,  
Unit-V: Chapter: 5.2,5.2.1,5.3,5.4,5.5,5.6& 8,8.1,8.2,8.3.

**REFERENCE BOOKS:**

1. Duraipandian and Laxmi Duraipandian(1965), "Analytical Geometry – 3D", Emerald Publishers, Chennai.
2. S.Santha &T.Pathinathan(2005), "3D Analytical Geometry & Propability", Vijay Nicole Imprints Pvt.Ltd.,Chennai.
3. P.R.Vittal [2003], "Coordinate Geometry", Margham Publication, Chennai.
4. P.Kandasamy, K.Thilagavathy (2004), "Mathematics for B.Sc" Vol-I, II, III & IV, S.Chand & Company Ltd, New Delhi-55.

<b>I – B.Sc (Maths)</b>	<b>CALCULUS</b> <b>For the students admitted from the</b> <b>year2014</b>	<b>MT203S</b>
<b>SEMESTER – II</b>		<b>HRS/WK – 6</b>
<b>CORE – 3</b>		<b>CREDIT – 4</b>

**OBJECTIVES**

The course aims to introduce the concepts of Differential Calculus, Curvature, Asymptotes, and Reduction formulae, Beta and Gamma Functions and Double Integrals.

**Course Outcomes:**

At the end of the Course the students should be able to exhibit

**CO1: Knowing the basics of differential calculus**

**CO2: Getting the knowledge of coordinates in differential calculus**

**CO3: Knowing the asymptotes of differential calculus**

**CO4: Knowing the basics of integral calculus**

**CO5: Receiving the knowledge of applications of integrals**

SEMESTER V	COURSE CODE: MT2035					TITLE OF THE PAPER: CALCULUS										HOURS: 6	CREDITS: 4
COURSE OUTCOME S	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	4	4	3	4	3	2	5	4	3	4	3	4	2	2	4	3.3	
CO2	3	4	3	3	2	2	5	3	2	3	3	4	2	3	4	3.1	
CO3	4	3	2	3	2	3	4	5	2	4	4	5	3	2	3	3.3	
CO4	3	4	2	2	3	2	5	3	2	3	2	4	2	3	2	2.8	
CO5	4	5	3	2	2	3	5	3	3	3	4	5	2	3	3	3.5	
Mean Overall Score															3.2		

This course is having **HIGH** association with programme outcomes and programme specific outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT - I:DIFFERENTIAL CALCULUS**

Jacobians – Derivative of implicit function using differentials, composite functions - Total differential – maxima and minima functions of 2 and 3 independent variable, Lagrange's method [without proof].

**UNIT - II:DIFFERENTIAL CALCULUS[Contd]**

Curvature, Radius of Curvature in Cartesian and Polar coordinates, p-r equation.

**UNIT – III: DIFFERENTIAL CALCULUS[Contd]**

Evolutes, Envelope, Asymptotes: Methods [without proof] of finding asymptotes of rational algebraic curves with special cases.

**UNIT –IV:INTEGRAL CALCULUS**

Reduction formulae, Beta , Gamma Functions and their Properties .

**UNIT –V: INTEGRAL CALCULUS[Contd]**

Change of order of Integration – Applications to Area, Surface Area and Volume.

**TEXT BOOKS:**

1. S.Narayanan and T.K.Manicavachagom Pillay [2006], "Calculus" Volume-I & II, S.Viswanathan Printers & Publishers Pvt.Ltd. Chennai.  
Volume-I: Unit-II- Chapter: X (Sec:2.1-2.4,2.6-2.8),  
Volume-II: Unit-IV- Chapter:1 (Sec:13.1-13.10) & Chapter:7 (Sec:2.1-6),
2. P.Kandasamy, K.Thilagavathy [2004], "Mathematics for B.Sc", Vol-I &II , S.Chand & Company Ltd., New Delhi-55.  
Volume-I: Unit-I- Pages:(199-209 , 215 – 241),  
Unit-IV- Chapter:3 (Pg No:303 -317)  
Volume-II: Unit-II-Chapter 2: (324-344)  
Unit-III- Chapter: 3 (Pgs:345 - 361) & Chapter:4 (Pgs:380 - 396).  
Unit-IV- Chapter:5 (Pg No:397 -428)  
Unit-V- Chapter:6 (Pg. no: 432-491)

**REFERENCE BOOKS:**

1. Shanti Narayan [2001], "Differential Calculus",Shyamlal Charitable Trust, New Delhi.
2. Shanti Narayan [2001], "Integral Calculus", S.Chand & Co. New Delhi.
3. S.Sudha [1998], "Calculus", Emerald publishers, Chennai.
4. G.B.Thomas and R.L.Finney[1998], "Calculus and Analytic Geometry", Addison Wesley [9<sup>th</sup> Ed], Mass.[Indian Print].
5. P.R.Vittal [2004], "Calculus", Margham Publication, Chennai.

<b>I – B.Sc (Maths)</b>	<b>NUMERICAL METHODS</b> <b>For the students admitted from the</b> <b>year 2015</b>	<b>MT204S</b>
<b>SEMESTER – II</b>		<b>HRS/WK – 5</b>
<b>CORE – 4</b>		<b>CREDIT – 4</b>

### OBJECTIVES

The course aims to introduce the concepts of Finite differences, Central differences, Interpolation for unequal intervals, Inverse interpolation and Solutions of simultaneous linear equations.

### COURSE OUTCOME:

CO1: Students able to solve the problems in Newton's forward and backward method.

CO2: Students able to solve analyse the difference between Gauss forward and backward,

Stirling's method and Bessel's method.

CO3: Students able to pertain equal intervals and unequal intervals.

CO4: Students able to determine the solutions for lineal algebraic equations.

CO5: Students able to determine the solutions for Numerical differential equations and integration.

SEMESTER II	COURSE CODE: MT204S					TITLE OF THE PAPER: NUMERICAL METHODS AND COMPUTER APPLICATION										HOURS: 5	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	4	3	3	4	5	5	2	4	3	5	2	3	4	3.6	
CO2	3	4	3	3	3	4	5	5	2	4	3	5	2	2	4	3.46	
CO3	3	4	4	3	3	4	4	5	2	4	3	5	2	2	4	3.46	
CO4	3	4	4	3	3	4	5	5	2	4	3	5	3	2	4	3.6	
CO5	3	4	3	3	3	4	5	5	2	4	3	5	2	2	4	3.46	
Mean Overall Score															3.5		

This course is having **HIGH** association with programme outcomes and programme specific outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT- I: FINITE DIFFERENCES**

First and higher order differences-forward differences and Backward differences-Operators, Relation between  $\nabla, \Delta$  and  $E$  – Interpolation –Gregory-Newton’s forward & backward formulae for interpolation-Factorial polynomial.

**UNIT-II: CENTRAL DIFFERENCES**

Central difference Operators – Central differences formulae- Gauss Forward and Backward formulae – Stirling’s formula – Bessel’s formula.

**UNIT–III: INTERPOLATING FOR UNEQUAL INTERVALS AND INVERSE INTERPOLATION**

Divided differences – Newton’s divided differences formula and Lagrange’s interpolation formula – Estimating the Missing terms [with one or more missing values] –Inverse Lagrange’s method.

**UNIT – IV: LINEAR ALGEBRAIC EQUATIONS**

Gauss elimination method – Gauss Jordan Method- Gauss Seidal method – Crout’s method [Three unknowns only]- inverse of a matrix-Gaussian method.

**UNIT – V: NUMERICAL DIFFERENTIAL EQUATIONS AND INTEGRATION**

Euler’s method-Improved Euler’s method- Modified Euler’s method- The Runge Kutta Method-Adam’s method-Trapezoidal rule-Simpson’s 1/3rd rule-Simpson’s 3/8 th rule.

**TEXT BOOKS:**

1. A.Singaravelu [2004], “Numerical Methods”, Meenakshi Agency, Chennai
2. M.K.Venkataraman(1992), “Numerical Methods for Science and Engineering”, National Publishing Company, Chennai.

**REFERENCE BOOKS:**

1. S.Arumugham[2003], “Numerical Methods”, New Gamma Publishing,

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Palayamkottai.

2. H.C.Saxena[1991], "Finite Differences and Numerical Analysis" ,S.Chand & Co. Delhi.
3. B.D.Gupta(2001), "Numerical Analysis", Konark Pub. Ltd., Delhi.
4. P.Kandasamy, K.Thilagavathy [2003], "Calculus of Finite difference & Numerical Analysis", S.Chand & Company Ltd., New Delhi-55.

<b>II – B.Sc (Maths)</b>	<b>DIFFERENTIAL EQUATIONS</b> <b>For the students admitted from the year</b> <b>2014</b>	<b>MT305S</b>
<b>SEMESTER – III</b>		<b>HRS/WK - 5</b>
<b>CORE – 5</b>		<b>CREDIT - 4</b>

**OBJECTIVES**

The course aims to introduce the concepts of Equations of the First Order and Higher Degree, Euler's homogeneous linear equations, Legendre's Linear Equations, Simultaneous Equations, Laplace Transform and Formation of PDF.

**COURSE OUTCOME:**

CO1: Students able to know the basics in Equations of the First Order and Higher Degree

CO2: Students able to understand Euler's homogeneous linear equations

CO3: Students able to do the problems in Different Methods in Differential Equations.

CO4: Students able to study the basics to know the Format of Partial Differential Equation

SEMESTER III	COURSE CODE: MT509					TITLE OF THE PAPER: DIFFERENTIAL EQUATIONS										HOURS: 5	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	3	4	4	2	3	4	3	4	3	5	2	3	4	3.5	
CO2	3	3	3	4	2	2	5	4	2	3	3	4	2	3	4	3.1	
CO3	4	3	2	3	2	3	4	5	2	3	4	5	3	2	3	3.2	
CO4	3	4	4	2	3	2	5	3	4	3	2	4	3	3	2	3.0	
CO5	4	5	3	2	2	3	5	3	3	3	5	5	2	3	3	3.4	
Mean Overall Score															3.24		

CO5: Students able to know the Laplace Transform and Formation of PDF

This course is having **HIGH** association with programme outcomes and programme specific outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT-I: ORDINARY LINEAR DIFFERENTIAL EQUATIONS:**

Equations of the First Order and Higher Degree- Equations Solvable for p- Equations Solvable for x - Equations Solvable for y – Clairaut's Equation- Equations of second and higher order with constant coefficients.

**UNIT – II: ORDINARY LINEAR DIFFERENTIAL EQUATIONS [Contd]:**

Euler's homogeneous linear equations – Legendre's Linear Equations- Method of Variation of Parameters- Method of undetermined Coefficients.

**UNIT III: TOTAL DIFFERENTIAL EQUATIONS**

Total Differential Equations – Different Methods of solving  $Pdx+Qdy+Rdz = 0$ .

**UNIT – IV: PARTIAL DIFFERENTIAL EQUATIONS:**

Formation of PDE – Complete Integral – Particular Integral – Singular Integral – Equation's Solvable by direct Integration – Solving equations of the types:  $f(p, q) = 0$ ,  $f(x, p, q) = 0$ ,  $f(y, p, q) = 0$ ,  $f(z, p, q) = 0$ ,  $f(x, p) = f(y, p)$ ,  $Z = p x + q y + f(p, q)$  - Lagrange's equations.

**UNIT – V: LAPLACE TRANSFORM:**

Transform – Inverse Transform – Application of Laplace Transform to solution of first and second order linear Differential equations [with constant coefficients] and simultaneous Linear Differential Equations.

**TEXT BOOK:**

1. P.Kandasamy, K.Thilagavathy [2004], "Mathematics for B.Sc" Vol-,III, S.Chand & Company Ltd., New Delhi-55.  
Unit-I: Chapters:1,2,3 (pgs: 1 - 41) ,Unit-II:Chapters:4,5 (pgs: 48 -87),  
Unit-III: Chapter:6 (pgs:92-116) , Unit-IV:Chapters:1,2 (pgs:117-185),  
Unit-V: Chapter:1 (pgs:164-185).

**REFERENCE BOOKS:**

1. M.D.Raisighanian, [2001], "Ordinary and Partial Differential Equations", S.Chand and Co., New Delhi
2. S.Sudha [1998], "Differential Equations and Integral Transforms", Emerald publishers, Chennai.
3. P.R.Vittal [2004], "Differential Equations and Laplace Transform", Margham Publication, Chennai.

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4. M.K.Venkataraman(1992),” Higher Engineering Mathematics: III-B”, National Publishing Company, Chennai.

<b>II – B.Sc (Maths)</b>	<b>VECTOR AND FOURIER ANALYSIS For the students admitted from the year 2014</b>	<b>MT306S</b>
<b>SEMESTER - III</b>		<b>HRS/WK – 6</b>
<b>CORE – 6</b>		<b>CREDIT – 4</b>

**OBJECTIVES**

The course aims to introduce the concepts of Differentiation of a Vector, Vector Differential Operator, Solenoidal and Irrotational, The Line Integral, Divergence Theorem and Green's Theorem, Stoke's Theorem, Fourier Expansion and Parseval's Identity for Fourier Transforms.

**COURSE OUTCOMES:**

CO1: develops the skill on solving problems on vector calculus

CO2: learns to solve problems on gradient and divergence and curl

CO3: knows the difference in line, surface and volume integral and their interpretation

CO4: enables to understand the concepts on Fourier series expansions and familiarizes with half range Fourier series along with periodic functions

CO5: analyze sine and cosine transforms and its properties

SEMESTER III	COURSE CODE: MT306S					TITLE OF THE PAPER: VECTOR AND FOURIER ANALYSIS										HOURS: 6	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	3	4	3	3	4	4	3	3	3	3	4	3	4	3	4	3.4	
CO2	3	3	3	4	3	3	4	4	3	4	3	4	3	3	3	3.3	
CO3	3	3	3	4	3	4	3	3	3	3	3	4	3	4	3	3.3	
CO4	3	3	4	4	3	3	4	4	3	3	3	4	3	4	3	3.4	
CO5	3	4	3	3	3	4	3	4	3	3	3	4	4	3	3	3.3	
Mean Overall Score																3.3	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT – I: DIFFERENTIAL VECTOR CALCULUS**

Differentiation of a Vector – Geometrical Interpretation of the Derivative – Differentiation Formulae – Differentiation of dot and Cross Products – Partial Derivatives of Vectors – Differentials of Vectors.

**UNIT – II: GRADIENT, DIVERGENCE AND CURL**

Vector Differential Operator Del – Gradient of a Scalar Function – Directional Derivative – Geometric Interpretation – Gradient of the sum of Functions; of the product of functions and of a function of function – Operations involving Del – Divergence of a Vector and its Physical Interpretation – Curl of a Vector and its Physical Interpretation – Expansion Formulae for Operators involving Del – Solenoidal and Irrotational.

**UNIT – III: VECTOR INTEGRATION**

The Line Integral – Surface Integral – Volume Integral – Theorem of Gauss Divergence, Stoke's Theorem and Green's Theorem [Without proof].

**UNIT – IV: FOURIER SERIES**

Conditions for Fourier Expansion – Functions having Discontinuity – Change of Interval – Odd and Even Functions – Expansions of Odd or Even periodic Functions – Half range series – Typical Wave Forms – Parseval's Formula.

**UNIT – V: FOURIER TRANSFORM**

Definition – Fourier Integrals – Fourier Sine and Cosine Integral – Complex Form of Fourier Integral – Fourier Transform: Fourier Sine and Cosine Transforms – Finite Fourier Sine and Cosine Transforms [with out proof] – Properties of Fourier Transforms – Convolution Theorem for Fourier Transforms – Parseval's Identity for Fourier Transforms – [without derivation].

**TEXT BOOKS:**

1. P.R.Vittal [2004], "Vector Analysis, Analytical Solid Geometry & Sequences & Series", Margham Publication, Chennai.  
Unit-I & II: Chapter-1, Unit-III: Chapter-2.
2. P.R.Vittal [2002], "Differential equations, Fourier & Laplace Transforms and Probability". Margham Publication, Chennai.  
Unit-IV & V: Chapter- 6 & 8.

**REFERENCE BOOKS:**

1. B.S.Grewal, "Higher Engineering Mathematics" [2002], Khanna Publishers, New Delhi.
2. M.K.Venkataraman (1992), "Higher Engineering Mathematics", III-B, National Publishing Company., Chennai.



<b>II – B.Sc (Maths)</b>	<b>FUZZY SETS AND ITS APPLICATION</b> <b>For the students admitted</b> <b>from the year 2017</b>	<b>MT407S</b>
<b>SEMESTER – IV</b>		<b>HRS/WK – 6</b>
<b>CORE – 7</b>		<b>CREDIT – 4</b>

**OBJECTIVES :** To get formalized with fuzzy principles and appreciate its nuances by constricting with crisp set and principles

**COURSE OUTCOMES:**

**CO1:** Provides knowledge on the basic definitions and fundamentals of Fuzzy set theory.

**CO2:** Able to understand idea on Fuzzy graphs and its properties

**CO3:** Improves their ability in the concept of Fuzzy relations in real life situations

**CO4:** Attains knowledge of the Fuzzy Logic in different forms

**CO5:** understands the applications of Fuzzy logic in day to needs

SEMESTER IV	COURSE CODE: MT407S					TITLE OF THE PAPER: FUZZY SETS AND APPLICATION											HOURS: 6	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S		
	PO1	PO 2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10			
CO1	4	3	3	4	4	4	3	3	4	3	4	3	3	3	4	3.5		
CO2	4	3	4	4	3	4	3	4	3	4	4	3	3	4	3	3.5		
CO3	3	3	4	3	4	3	4	3	3	4	3	3	4	4	4	3.5		
CO4	3	4	3	3	3	4	3	4	3	3	3	4	3	4	4	3.4		
CO5	4	4	4	4	3	4	3	4	4	3	4	4	3	3	3	3.6		
Mean Overall Score																3.5		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**Unit I - Fuzzy set theory**

Fuzzy sets – Fuzzy set : definition – Different types of fuzzy sets – General definitions and properties of fuzzy sets – Other important operations – General properties : Fuzzy vs Crisp.

(Sec: 1.16 – 1.21)

**Unit II – Operations on Fuzzy sets**

Introduction – Some important theorems – fuzzy compliments – Further operations on fuzzy sets – t-norms and t-conorms – Intersection and union of fuzzy sets.

(Sec: 2.1, 2.2, 2.4 – 2.9)

**Unit III – Fuzzy numbers and arithmetic**

Introduction – fuzzy numbers – algebraic operations with fuzzy numbers – binary operation of two fuzzy numbers – Some special extended operations – Interval analysis in arithmetic – Lattice of fuzzy numbers.

(Sec: 3.1 – 3.5 and 3.11, 3.12)

**Unit iv – Fuzzy relations and fuzzy graphs.**

Introduction – Composition – Properties of Min-max composition – binary relations on a single set – compatibility relation – fuzzy ordering relation.

Sec: 4.1 and 4.3 -4.7)

**Unit v – Fuzzy logic**

Fuzzy logic – Fuzzy connectives – fuzzy inference – fuzzy propositions – fuzzy quatifiers – linguistic hedges.

(Sec: 7.13 – 7.18)

**Text book** :Dr.Sudhir K.Pundir and Dr.Rimple Pundir, Fuzzy sets and their applications.

**Reference:** A.Kaufmann “Introduction to the Theory of fuzzy

<b>II – B.Sc (Maths)</b>	<b>GRAPH THEORY</b> <b>For the students admitted</b> <b>from the year 2008</b>	<b>MT408</b>
<b>SEMESTER – IV</b>		<b>HRS/WK - 5</b>
<b>CORE – 8</b>		<b>CREDIT - 4</b>

**OBJECTIVES**

The course aim is to introduce the concepts of Graphs, Sub graphs, Adjacency and incidence matrices, Connectedness and components, Eulerian graphs and Hamiltonian graphs, Characterizations of planar graph and chromatic number and index.

**COURSE OUTCOMES:**

CO1: Know the variety of example and some elementary results.

CO2: Learn to justify some operation and mathematical expression on graph.

CO3: know the basic properties of connected and disconnected graphs.

CO4: Able to understand the concept of euler and Hamiltonian in the area of puzzles and games

CO5: Enable to understand the Chemical composition using trees and colouring in real life situation.

SEMESTER IV	COURSE CODE: MT408					TITLE OF THE PAPER: GRAPH THEORY										HOURS: 5	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PS O1	PS O2	PS O3	PS O4	PS O5	PS O6	PS O7	PS O8	PS O9	PSO 10		
CO1	2	5	2	2	2	3	5	2	4	4	2	3	4	3	4	3.1	
CO2	4	5	3	4	3	4	4	3	5	4	3	4	5	3	5	3.9	
CO3	2	4	3	3	2	3	5	2	4	5	2	3	4	4	4	3.3	
CO4	3	5	3	4	2	5	4	3	3	4	3	3	5	3	4	3.6	
CO5	2	4	3	4	2	3	5	2	4	4	2	4	4	4	4	3.4	
<b>Mean Overall Score</b>															<b>3.4</b>		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT – I:**

Graphs- Sub graphs- Degree of a vertex- Isomorphism of graph- independent sets and coverings- intersection graphs.

**UNIT –II:**

Adjacency and Incidence matrices- Operations on graphs- Degree sequences- Graphic sequences- Walks- trails- paths.

**UNIT –III:**

Connectedness and components- Cut point- Bridge- Block- Connectivity theorems.

**UNIT – IV:**

Eulerian graphs and Hamiltonian graphs- Trees.

**UNIT – V:**

Planarity- Characterizations of planar graph- Colourability- Chromatic number and index.

**TEXT BOOK:**

S. Arumugam and S. Ramachandran, "Invitation to Graph Theory", Sitech Publications India Pvt Ltd, 7/3C, Madley Road, T. Nagar, Chennai – 17.

Unit-I: Chapters: 2(2.0 - 2.7),

Unit-II: Chapters: 2,3 &4(Sec:2.8 - 2.9,3.0-3.2,4.0-4.1),

Unit-III: Chapters: 4(4.2,4.3,4.3,4.4),

Unit-IV: Chapters: 5 &6(Sec:5.0 - 5.2,6.0-6.2),

Unit-V: Chapters: 8&9(Sec: 8.0 - 8.2, 9.0-9.1).

**REFERENCE BOOKS:**

1. S. Kumaravelu, and Susheela Kumaravelu, "Graph Theory", Publishers, 182, Chidambara Nagar, Nagercoil-629 002.
2. S. A. Choudham, "A First Course In Graph Theory", Macmillan India Ltd.
3. Robin J. Wilson, "Introduction to Graph Theory", Longman Group Ltd.
4. J.A. Bondy and U. S. R. Murthy, "Graph Theory with Applications", Macmillan, London.

<b>YEAR – III</b>	<b>ABSTRACT ALGEBRA</b> <b>For the students admitted</b> <b>from the year 2008</b>	<b>MT509</b>
<b>SEMESTER –V</b>		<b>Hrs / Week: 6</b>
<b>CORE –IX</b>		<b>Credit: 5</b>

**COURSE OUTCOME:**

- CO1: Students able to identify groups and subgroups.  
 CO2: Students able to understand homomorphism and isomorphism.  
 CO3: Students able to do the problems in permutation.  
 CO4: Students able to study the basics of rings, ideals and integral domain.  
 CO5: Students able to apply Euclidean rings in theorems.

SEMESTER V	COURSE CODE: MT509					TITLE OF THE PAPER: ABSTRACT ALGEBRA										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	4	3	3	4	5	5	2	4	3	5	2	3	4	3.6	
CO2	3	4	3	3	3	4	5	5	2	4	3	5	2	2	4	3.46	
CO3	3	4	4	3	3	4	4	5	2	4	3	5	2	2	4	3.46	
CO4	3	4	4	3	3	4	5	5	2	4	3	5	3	2	4	3.6	
CO5	3	4	3	3	3	4	5	5	2	4	3	5	2	2	4	3.46	
Mean Overall Score															3.5		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT – I: GROUPS**

Definition of a Group - Examples – Subgroups

**UNIT – II: GROUP [CONTD]**

Counting Principle – Normal Subgroups – Homomorphism.

**UNIT – III: GROUP [CONTD]**

Automorphisms – Cayley’s Theorem – Permutation Groups.

**UNIT – IV: RINGS**

Definition and Examples - Integral Domain – Homomorphism of Rings – Ideals and Quotient Rings.

**UNIT – V : RINGS [CONTD]**

Prime Ideal and Maximal Ideal – The field of quotients of an Integral domain – Euclidean rings.

**TEXT BOOK:**

I.N.Herstein.[1989], “Topics in Algebra”, [2<sup>nd</sup> ed] Wiley Eastern Ltd. New Delhi.  
Chapter:2 (Sec: 2.1 – 2.10 [Omit Applications 1 and 2 of 2.7]),  
Chapter : 3 (Sec: 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7)

**REFERENCE BOOKS:**

1. S.Arumugam[2004], “Modern Algebra”, SciTech Publications, Chennai.
2. J.B.Fraleigh [1987], “A First Course in Algebra”, [ 3<sup>rd</sup> edition] Addison Wesley, Mass. [Indian Print]
3. Lloyd R.Jaisingh and Frank Ayres,Jr. [2005], “Abstract Algebra”, [2<sup>nd</sup> edition], Tat McGraw Hill, New Delhi.
4. M.L.Santiago[2002], “Modern Algebra”, Tat McGraw Hill, New Delhi
5. SurjeetSingh and Qazi Zameeruddin[1982], “Modern algebra”, Vikas Publishing House Pvt.Ltd. New Delhi.

<b>YEAR – III</b>	<b>REAL ANALYSIS- I</b> <b>For the students admitted</b> <b>from the year 2008</b>	<b>MT510</b>
<b>SEMESTER –V</b>		<b>Hrs / Week: 6</b>
<b>CORE –X</b>		<b>Credit: 5</b>

### Objectives

To expose the students to the basics of real analysis and studying the notion of continuous functions and related theorems

### Course Outcome:

At the end of the course students will be able to

CO1: Define and recognize the basic properties of the field of real numbers.

CO2: Define and recognize the sequence and convergence of sequences.

CO3: Find the limit of wide class of sequences of real numbers

CO4: Decide on convergence or divergence of a wide class of series of real numbers.

CO5: Define and recognize continuity of real functions, open and closed sets.

SEMESTER I	COURSE CODE: MT510					TITLE OF THE PAPER: REAL ANALYSIS I										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	3	4	3	3	3	5	5	2	5	3	4	2	2	5	3.46	
CO2	3	4	4	3	3	3	5	5	3	5	3	5	2	3	5	3.7	
CO3	3	4	4	3	3	3	5	5	2	5	3	4	2	2	5	3.5	
CO4	3	4	5	3	3	4	5	5	2	5	3	4	2	2	5	3.67	
CO5	3	4	4	3	3	3	5	5	2	5	3	4	2	2	5	3.5	
Mean Overall Score															3.56		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT – I:**

Functions – Real valued functions – Equivalence – Countability and Real numbers- Least Upper Bound.

**UNIT – II: SEQUENCES**

Definition – Subsequences – Limit of sequence – Convergent Sequence – Divergent Sequence – Bounded Sequence – Mono tone Sequence.

**UNIT – III: SEQUENCES [CONTD]**

Operations on Convergent Sequence Operation on Divergent Sequence – Limit Superior and Limit Inferior – Cauchy sequence. Series: Convergence and Divergence – Series with non-Negative terms – Alternating series – Conditional Convergence and Absolute Convergence.

**UNIT –IV: SERIES [CONTD]**

Rearrangement of Series – Tests for Absolute Convergence – Series whose terms form a non increasing Sequence – Summation of Parts. Limits and Metric spaces: Limit of an Function of the Real Line – Metric Spaces – Limits in Metric Spaces.

**UNIT – V: CONTINUOUS FUNCTIONS ON METRIC SPACES**

Functions Continuous at a point on the real line – Reformulation – Functions Continuous on a Metric Spaces – Open sets – Closed Sets.

**TEXT BOOK:**

R.Goldberg[2000], “Methods of Real Analysis”, Oxford & IBH Publishing Co., New Delhi.

Unit-I: Chapter:1(1.3 - 1.7),

Unit-II: Chapter:2 (2.1-2.6),

Unit-III: Chapter:2,3(2.7-2.10,3.1-3.4),

Unit-IV: Chapter:3,4 (3.5 -3.8,4.1-4.3),

Unit-V: Chapter:5(5.1 -5.5).

**REFERENCE BOOKS:**

1. Tom M. Apostol [1974]. Mathematical Analysis, 2<sup>nd</sup> Edition, Addison – Wesley, New York.
2. Bartle,R.G. and Shebert [1976], “Real Analysis”, John Willy & Sons Inc., New York.
3. Malik, S.C and Savitha Arora [1991], “Mathematical Analysis”, Willy Eastern Ltd, New Delhi.

<b>YEAR – III</b>	<b>COMPLEX ANALYSIS-I</b> <b>For the students admitted</b> <b>from the year 2008</b>	<b>MT511</b>
<b>SEMESTER –V</b>		<b>Hrs / Week: 6</b>
<b>CORE –XI</b>		<b>Credit: 4</b>

**OBJECTIVES:**

The course aims to introduce the concepts of complex numbers, functions of complex variables, limits and continuity, Cauchy Riemann equations and analytic functions, elementary functions, Definite integrals of functions.

**COURSE OUTCOMES:**

**CO1: Analyze and solve problems using complex numbers.**

**CO2: Knowledge pertaining to functions of complex variables, limits and continuity.**

**CO3: Analyze and solve problems using Cauchy Riemann equations and analytic functions.**

**CO4: Knowledge pertaining to elementary functions.**

**CO5: Analyze and solve problems using Definite integrals of functions.**

SEMESTER V	COURSE CODE: <b>MT511</b>					TITLE OF THE PAPER: <b>COMPLEX ANALYSIS-I</b>										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	4	4	3	3	4	3	5	4	3	4	3	4	3	4	4	3.7	
CO2	3	4	3	3	3	3	5	4	3	4	4	4	3	4	5	3.7	
CO3	3	5	3	3	4	4	5	4	3	5	3	4	4	4	4	3.9	
CO4	3	5	3	3	4	4	5	4	3	4	4	4	3	4	4	3.8	
CO5	4	4	3	3	4	4	5	4	3	5	4	4	4	4	4	3.9	
Mean Overall Score																3.8	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT- I:**

Complex numbers: Sums and products – Basic algebraic properties – Further properties – Vectors and Moduli – Complex conjugates – Exponential form – Products and powers in exponential form – Arguments of products and quotients – Roots of complex numbers – Examples – Regions in the complex plane.

**UNIT- II:**

Functions of a Complex variable – Mappings - Mapping by the exponential function– Limits – Theorems on Limits – Limits involving the point at infinity – Continuity – Derivatives –Differentiation formulas

**UNIT- III:**

Cauchy-Riemann Equations-Sufficient Conditions For Differentiability-Polar Coordinates-Analytic Functions-Examples-Harmonic Functions-Uniquely Determined Analytic Functions-Reflection Principle.

**UNIT- IV:**

The Exponential Function-The Logarithmic Function-Branches And Derivatives Of Logarithms-Trigonometric Functions-Hyperbolic Function.

**UNIT- V:**

Derivatives of Functions  $w(t)$ - Definite Integrals of Functions  $w(t)$ - Contours-Contour Integrals-Some Examples-Upper Bounds For Moduli of Contour Integrals- Antiderivatives-Proof of The Theorem-Cauchy-Goursat Theorem-Proof of The Theorem(omit proof of the lemma).

**TEXT BOOK:**

“Complex Variables and Applications”, James Ward Brown, Ruel V. Churchill, McGraw – Hill International Edition(2009).

Unit-I: Chapter-1 (sec: 1 - 11), Unit-II: Chapter-2 (Sec: 12 - 20),Unit-III: Chapter-2 (Sec: 21-28),

Unit-IV:Chapter-3 (Sec: 29-31 ,34-35), Unit-V:Chapter-4 (Sec: 37-41,43-47).

**REFERENCE BOOKS:**

1. “Functions of a Complex Variable”, J.K.Goyal , K.P. Gupta(18<sup>th</sup> Revised), Enlarged Edition 2004, Pragathi Prakashan Publishers, Meerut, UP.
2. P.Duraipandian and Laxmi Duraipandian(1976), “Complex Analysis”,

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Emerald Publishers, Chennai.

3. S.Ponnusamy(2000), "Foundations of Complex Analysis", Narosa Publishing House, New Delhi.
4. Murray R. Spiegel(2005), "Theory and Problems of Complex Variable", Tata-McGraw Hill Edition, New Delhi.

<b>YEAR – III</b>	<b>MECHANICS</b> <b>For the students admitted</b> <b>from the year 2017</b>	<b>18EMT512</b>
<b>SEMESTER –V</b>		<b>Hrs / Week: 5</b>
<b>ELECTIVE-I</b>		<b>Credit: 4</b>

**OBJECTIVES:**

The course aims to introduce the concepts of complex numbers, functions of complex variables, limits and continuity, Cauchy Riemann equations and analytic functions, elementary functions, Definite integrals of functions.

**COURSE OUTCOMES:**

**CO1: Analyze and solve problems using complex numbers.**

**CO2: Knowledge pertaining to functions of complex variables, limits and continuity.**

**CO3: Analyze and solve problems using Cauchy Riemann equations and analytic functions.**

**CO4: Knowledge pertaining to elementary functions.**

**CO5: Analyze and solve problems using Definite integrals of functions.**

SEMESTER V	COURSE CODE: <b>MT511</b>					TITLE OF THE PAPER: <b>COMPLEX ANALYSIS-I</b>										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	4	4	3	3	4	3	5	4	3	4	3	4	3	4	4	3.7	
CO2	3	4	3	3	3	3	5	4	3	4	4	4	3	4	5	3.7	
CO3	3	5	3	3	4	4	5	4	3	5	3	4	4	4	4	3.9	
CO4	3	5	3	3	4	4	5	4	3	4	4	4	3	4	4	3.8	
CO5	4	4	3	3	4	4	5	4	3	5	4	4	4	4	4	3.9	
Mean Overall Score																3.8	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT-I FORCE:**

Types of Force- Magnitude and direction of the resultant of the force acting on a particle – Triangle of Force –Lamie’s Theorem.

**UNIT-II KINEMATICS:**

Kinematics of a particle- Velocity-Acceleration-Relative Velocity-Relative Acceleration- Angular Velocity-Acceleration Components in Co-planer motion along

[a] Two fixed perpendicular direction ,

[b] Tangential and Normal Direction

[c] Radial and Transverse direction .

Work, Power, Energy , Principle of Work and Energy. Rectilinear motion with uniform acceleration. Simple Harmonic Motion.

**UNIT-III PROJECTILES**

Motion of the Projectile , Nature of Trajectory, Result Pertaining to the motion of the projectile, range on an inclined plane.

**UNIT-IV CENTRAL ORBIT**

Central Forces and Central Orbit , Equation of Central orbit, Finding Law of Force and Speed of a given orbit , finding the orbit given the Law of Force .

**UNIT-V MOMENTUM OF INERTIA**

Momentum of Inertia of Simple Body, Theorems of Parallel and Perpendicular Axes , Momentum of Inertia Triangular Lamina, Circular Lamina, Circular Ring , Right Circular Cone, Sphere.(Solid and Hollow )

**TEXT BOOK:**

P.Duraipandian, Lakshmi Duraipandian and Muthamizh Jayapragasam [2012], "Mechanics", Revised Edition, S.Chand & Co, New Delhi.

Unit-I: Chapter-2 & 3 (sec: 2.1-2.2), and 3.2-3.4

Unit-II: Chapter-1 (Sec: 1.2,2.2,2.3,1.3,4.1,4.2,4.3,),Chapter 11(sec 11.1-11.3) chapter -1(1.3.1,1.3.2), Chapter- 12(12.1-12.1.2)

Unit-III: Chapter-13 (Sec: 13.1,13.1-13.1.3,4-6,13.2,13.2.1),

Unit-IV:Chapter-16 (Sec:16.1,16.2,16.2.1,16.2.2,16.2.3,16.3 ),

Unit-V:Chapter-17 (Sec:17.1-17.1.1).

**REFERENCE BOOKS:**

1. A.V.Dharmapadam [1991], "Mechanics" ,S.Viswanathan and Co. Chennai.
2. S.L.Loney [1982], "Elements of Dynamics", Macmillan India, Delhi.
3. M.K.Venkataraman [1990], "Dynamics", Agasthier Book Depot, Trichy- 1.
4. P.N.Chatterjee[1992], "Dynamics", A Rajhans Publication, (19<sup>th</sup> Ed) .
5. Joseph F.Shelley [2005], "Vector Mechanics for Engineers Vol-I: Dynamics", Tata McGraw Hill Edition, New Delhi.

<b>YEAR – III</b>	<b>A SPECIAL FUNCTIONS For the students admitted from the year 2017</b>	<b>EMT512A</b>
<b>SEMESTER –V</b>		<b>Hrs / Week: 5</b>
<b>ELECTIVE -I</b>		<b>Credit: 4</b>

**Objectives :**

To develop computational skill in certain special functions which are frequently occurring in higher mathematics and mathematical physics.

**Course Outcome:**

At the end of the course students will be able to

CO1: Analyze the properties of linear operators and solve simultaneous linear differential

equations .

CO2: Solve types of non-linear equations and numerical solutions using Taylors Series.

CO3: Analyze extrapolating data using differences properties of power series.

CO4: Solve second order differential equations.

CO5: Solve Bessel's function and Legendre function.

SEMESTER I	COURSE CODE:					TITLE OF THE PAPER: A Special functions										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	4	3	3	5	4	4	2	4	3	4	3	3	5	3.6	
CO2	3	4	4	3	2	5	5	4	2	5	3	4	3	2	4	3.5	
CO3	3	4	4	3	3	5	4	4	2	5	3	4	4	3	4	3.67	
CO4	3	4	4	3	3	5	4	4	3	5	3	4	3	2	4	3.6	
CO5	3	4	4	4	3	4	4	4	2	5	3	4	3	3	4	3.6	
Mean Overall Score																3.59	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT-I**

Properties of Linear Operators - Simultaneous Linear Differential Equations –

**UNIT-II**

Special Solvable Types of Nonlinear Equations. Numerical Solutions Using Taylor Series –

**UNIT-III**

Adams and Modified Adams Method - Extrapolation with Differences  
Properties of Power Series - Examples

**UNIT-IV**

Singular Points of Linear Second Order Differential Equations - Method of Frobenius.

**UNIT-V**

Bessel Functions - Properties – Legendre Functions.

**Recommended Text**

F.B.Hildebrand. (1977) Advanced Calculus for Applications. Prentice Hall. New Jersey.

**Reference Books**

1. J.N.Sharma and R.K.Gupta (1998) Special Functions, Krishna PrakashanMandir, Meerut.
2. SatyaPrakash. (2004) Mathematical Physics. Sultan & Sons. New Delhi. 3. B.D.Gupta (1978) Mathematical Physics, Vikas Publishing House.

<b>YEAR – III</b>	<b>MATLAB</b> <b>For the students admitted</b> <b>from the year 2014</b>	<b>EMT513S</b>
<b>SEMESTER –V</b>		<b>Hrs / Week: 3</b>
<b>ELECTIVE-II</b>		<b>Credit: 2</b>

**Objectives:** Basic Structure of MatLab- Programming style- Executing a ‘MaLab’ Programs –Arrays in MatLab. Basic Ideas about to solve ODE , Numerical Integration in MatLab.

**Course Outcome:**

At the end of the course students will be able to

CO1: Analyze the properties of linear operators and solve simultaneous linear differential

equations .

CO2: Solve types of non-linear equations and numerical solutions using Taylors Series.

CO3: Analyze extrapolating data using differences properties of power series.

CO4: Solve second order differential equations.

CO5: Solve Bessel’s function and Legendre function.

SEMESTER I	COURSE CODE:					TITLE OF THE PAPER: A Special functions										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	4	3	3	5	4	4	2	4	3	4	3	3	5	3.6	
CO2	3	4	4	3	2	5	5	4	2	5	3	4	3	2	4	3.5	
CO3	3	4	4	3	3	5	4	4	2	5	3	4	4	3	4	3.67	
CO4	3	4	4	3	3	5	4	4	3	5	3	4	3	2	4	3.6	
CO5	3	4	4	4	3	4	4	4	2	5	3	4	3	3	4	3.6	
Mean Overall Score																3.59	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT – I     STARTING WITH MATLAB, CREATING ARRAYS**

Starting with MATLAB, MATLAB Windows – Working in the Command windows – Arithmetic Operations with Scalars – Display formats – Elementary Math Bult in functions – Defining Scalar Variable – Creating one dimensional arrays and Creating two dimensional arrays.

**Chapter 1:** 1.1 – 1.6 **Chapter 2:** 2.1 – 2.2

**UNIT – II     MATHEMATICAL OPERATIONS WITH ARRAYS**

Addition and Subtraction – Array Multiplication – Array Division – Element by Element Operation – Using Arrays in MATLAB – Bult in Math Function – Bult in Functions for Analyzing Arrays.

**Chapter 3:** 3.1 – 3.6

**UNIT – III     PROGRAMMING IN MATLAB**

Relational operator and Logical operator – Conditional Statement – The Switch Statement – Loops – Nested Loop and Nested Conditional Statement – The Break and Continue Commands.

**Chapter 7 :** 7.1 – 7.6

**UNIT – IV     POLYNOMIALS, CURVE FITTING AND INTERPOLATION**

Polynomials – Curve fitting – Interpolation – The Basic fitting Interface.

**Chapter 8:** 8.1 – 8.4

**UNIT – V     APPLICATION IN NUMERICAL ANALYSIS**

Solving an Equation with one variable – Finding a Maximum or a Minimum of a function – Numerical Integration – Ordinary Differential Equation.

**Chapter 10:** 10.1 – 10.4

**Text Book :**

**MATLAB An Introduction with Applications**

AMOS GILAT – John wiley& sons, INC

<b>YEAR-III</b>	<b>PROGRAMMING IN MATLAB</b> <b>For the students admitted</b> <b>from the year 2015</b>	<b>MTP501</b>
<b>SEMESTER – V</b>		<b>HRS/WK - 2</b>
<b>Elective Practical</b>		<b>CREDIT – 2</b>

The following exercise shall be performed as minimum mandatory requirements [for eligibility to take the practical examination] and a RECORD of the code-listing and outputs shall be maintained by each student.

Matrix Manipulation

To Solve the System of Linear Equation

To Solve the Quadratic Equation

To Check Palindrome

To Generate Fibonacci Numbers

To Find the Binomial Coefficient

Two Dimensional And Three Dimensional Graphs

Sub-Plots

Trapezoidal Rule

Differentiation

<b>YEAR-III</b>	<b>Theory of Fuzzy number System (Optional Paper) For the students admitted from the year 2015</b>	<b>EMT513A</b>
<b>SEMESTER – V</b>		<b>HRS/WK – 6</b>
<b>ELECTIVE-II (OPTIONAL)</b>		<b>CREDIT – 4</b>

**OBJECTIVES:** To get formalized with fuzzy principles and appreciate its nuances by constricting with crisp set and principles

**COURSE OUTCOMES:**

CO1: Provides knowledge on the basic definitions and fundamentals of Fuzzy set theory.

CO2: Able to understand idea on Fuzzy graphs and its properties

CO3: Improves their ability in the concept of Fuzzy relations in real life situations

CO4: Attains knowledge of the Fuzzy Logic in different forms

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

CO5: understands the applications of Fuzzy logic in day to needs

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes

SEMESTER:V	COURSE CODE: EMT513A					TITLE OF THE PAPER: Theory of Fuzzy number System								HOURS:6	CREDITS:5	
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)								MEAN SCORE OF CO'S		
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10	
CO1	4	3	3	4	4	4	3	3	4	3	4	3	3	3	4	3.5
CO2	4	3	4	4	3	4	3	4	3	4	4	3	3	4	3	3.5
CO3	3	3	4	3	4	3	4	3	3	4	3	3	4	4	4	3.5
CO4	3	4	3	3	3	4	3	4	3	3	3	4	3	4	4	3.4
CO5	4	4	4	4	3	4	3	4	4	3	4	4	3	3	3	3.6

Unit I –Introduction-The need of fuzzy approach Crisp sets- Set of properties and operations-Fuzzy subsets – Membership Values –Fuzzy subset operations- Difference between fuzzy subsets and Crisp Sets. Relations-Mapping –Fuzzy relations-Important Properties- Composition of two fuzzy relations- Variation between ordinary relation and Fuzzy relation. Logic-Fuzzy logic and the difference.

Unit II – Matrices-Matrix types and Operations-Neurons-Neural Networks-Synoptic Models-Relation Repration in matrix form-Fuzzy casual relation and its representation in matrix format- Simple Application

Unit III –Different Fuzzy Model –Bidirectional Associative Memories(BAM)- Fuzzy Cognitive Maps(FCM) and its Variations.

Unit IV :Fuzzy Ralational Map (FRM) and its Variation –Their induced Model. Simple Applications

Unit V:Graphs –Fuzzy Graphs-Simple Applications-Numbers-Fuzzy numbers- Different typers of Fuzzy numbers- simple Application.

Text book (i) A.Kaufmann “Introduction to the Theory of fuzzy subsets , Academic pres,INC, Newyork 1975

Unit-I: Chapter I (Sec-1-9) Chap-2(sec-12-17,19-26)

Unit-II: Chap-3:(Page-191-264)

(ii) Bart Kosko, Neural Networks and Fuzzy System, Printice –Hall,INC,New jersey,1992

Unit II: Chapter 2 . Chapter 8:299-308

Unit-III and IV chapter 3 (pg.No 79-84) , Chapter 4 (pg.No 152-158) and Chapter 8 (pg. No 299-307)

(iii) Neural Networks and Fuzzy systems: A Dynamical Systems Approach to Machine Intelligence –Bart Kosko, Prentice Hall, New Jersey, 1992

Unit V: Chapter 2 (pg. No : 19-70) Chapter 3 (pg. No 108-111, 120-123)

(iv) Fuzzy Graphs And Fuzzy Hypergraphs – JohnN.Mordeson, Premchand S.Nair, Physica- Verlag, Springer Verlag Publisher, USA,2000

Unit V Chapter :2 (pg. No: 45-73) and Chapter 5 (pg. No 127-142).

(v): Fuzzy Sets and Fuzzy Logic: Theory and Application-George J Klir and Bo Yuan, Printice-Hall, INC New Jersey 2002 Unit V: Chapter -4 Pg. No 97-117

<b>B.Sc(MATHS)</b>	<b>Arithmetic and Quantitative Aptitude for Competitive Examinations For the students admitted from the year 2019</b>	<b>19SMT51</b>
<b>SEMESTER-V</b>		<b>HRS/WK – 2</b>
<b>SEC</b>		<b>CREDIT – 2</b>

**OBJECTIVES**

The course aim is to help the students to do sums quickly and accurately in a given time schedule

**UNIT-I (CHAPTER-1&5)**

Simple and Compound interest, Profit and Loss

**UNIT-II (CHAPTER- 2&6)**

Time and Distance, Time and Work

**UNIT-III (CHAPTER-7&9)**

Percentage, Ratio and Proportion

**UNIT-IV (CHAPTER-20)**

Summation of Series (A.P and G.P)

**UNIT-V (CHAPTER-15)**

Odd man out Series

**REFERENCE BOOKS:**

1. R. Gopal, J.V. Subramanyam, M.Uma Bala , "Arithmetic and Quantitative Aptitude for Competitive Examinations", Sura publication(2008).
2. Dr.R.S.Aggarwal, "Quantitative Aptitude for Competitive Examinations", S. Chand Pvt Ltd(2017).

<b>B.Sc(MATHS)</b>	<b>HISTORY OF MATHEMATICS</b> <b>For the students admitted from the year 2019</b>	<b>19SSMT52</b>
<b>SEMESTER-V</b>		<b>HRS/WK – 2</b>
<b>SSC</b>		<b>CREDIT – 2</b>

**Book Name :** History of Mathematics

**Author:** Smorynski, Craig

**Publication:** (2008) Springer Science+Business Media, LLC

**ISBN :** 978-0-387-75480-2

<b>YEAR– III</b>	<b>LINEAR ALGEBRA</b> <b>For the students admitted</b> <b>from the year 2008</b>	<b>MT614</b>
<b>SEMESTER –VI</b>		<b>Hrs / Week: 6</b>
<b>CORE-XIII</b>		<b>Credit: 5</b>

**Objectives:**

Continuations of Abstract Algebra, we study about Vector Spaces and its linear equations.

**Course Outcomes:**

This paper will make the students to learn to convert Vector Spaces to Algebraic equations.

CO1: Beginning with Linear Dependence and Linear Independence on Vector Space

CO2: Knowing about Dual spaces and Inner product spaces on Vector space

SEMESTER VI	COURSE CODE: MT614					TITLE OF THE PAPER: LINEAR ALGEBRA											HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)											MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10			
CO1	4	4	3	4	3	2	5	5	3	5	3	4	2	2	4	3.5		
CO2	3	4	3	3	2	2	5	3	3	3	3	4	2	3	4	3.1		
CO3	4	3	2	3	2	3	4	5	3	4	4	5	3	3	3	3.4		
CO4	3	4	2	2	3	3	5	3	2	4	3	4	2	3	2	3.0		
CO5	4	5	3	2	2	3	5	3	3	4	4	5	4	3	3	3.5		
Mean Overall Score																3.3		

CO3: Learning to study about Algebra of Linear transformations and its characteristic roots

CO4: Converting Linear equations of Vector space to Matrices its canonical and triangular forms

CO5: Deriving Trace and Transpose of Matrices.

This course is having **HIGH** association with programme outcomes and programme specific outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT - I : VECTOR SPACES**

Linear dependence and independence- Definition and examples.

**UNIT – II: VECTOR SPACES [CONTD]**

Dual space – inner product spaces.

**UNIT – III: LINEAR TRANSFORMATIONS**

Algebra of linear transformations – characteristics roots;

**UNIT – IV : LINEAR TRANSFORMATIONS [CONTD]**

Matrices, canonical forms: triangular forms.

**UNIT – V: LINEAR TRANSFORMATIONS [CONTD]**

Trace and Transpose, Determinants

**TEXT BOOK:**

I.N.Herstein [1989], “Topics in Algebra”, Wiley Eastern Ltd. New Delhi.  
Chapters – 4 & 6( Sec: 4.1, 4.2, 4.3, 4.4 & 6.1, 6.2, 6.3, 6.4, 6.8, 6.9).

**REFERENCE BOOKS:**

1. S.Arumugam.[2004], “Modern Algebra”, Scitech Publications, Chennai.
2. J.B.Fraleigh [1987], “A First Course in Algebra”, [ 3<sup>rd</sup> edition] Addison Wesley, Mass. [Indian Print]
3. Lloyd R.Jaisingh and Frank Ayres,Jr. [2005], “Abstract Algebra”, [2<sup>nd</sup> edition], Tata McGraw Hill, New Delhi.
4. M.L.Santiago[2002], “Modern Algebra”, Tata McGraw Hill, New Delhi
5. Surjeet Singh and Qazi Zameeruddin[1982], “Modern algebra”, Vikas Publishing House Pvt.Ltd. New Delhi.

<b>YEAR – III</b>	<b>REAL ANALYSIS-II</b> <b>For the students admitted</b> <b>from the year 2008</b>	<b>MT615</b>
<b>SEMESTER –V</b>		<b>Hrs / Week: 6</b>
<b>CORE-XIV</b>		<b>Credit: 5</b>

**OBJECTIVE:**

To develop the understanding of complete, compactness of sequence and series of functions, integration process of Riemann and to enhance the mathematical maturity and to work comfortably with concepts

**COURSE OUTCOMES:**

The students after undergoing this course will be able to

**CO1:** Describe open sets, connected sets and bounded sets

**CO2:** Learn completeness and compactness of metric spaces

**CO3:** Determine the Riemann integrability of a bounded function and prove a selection theorems concerning integration

**CO4:** Apply the mean value theorem and the Fundamental theorem of calculus to problems in the context of real analysis

**CO5:** Study Taylor's, Binomial theorem and L'Hospital rule and find solution to problems

SEMESTER VI	COURSE CODE: MT615					TITLE OF THE PAPER: : REAL ANALYSIS-II										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	5	5	4	4	3	3	5	5	3	5	4	4	2	3	5	4.0	
CO2	5	5	4	3	3	2	5	4	3	5	3	3	2	3	5	3.67	
CO3	4	5	4	3	4	2	5	5	3	4	3	5	2	3	5	3.8	
CO4	4	5	4	4	3	2	5	4	3	4	4	4	2	3	5	3.73	
CO5	5	5	4	4	2	3	5	4	3	4	4	3	2	3	5	3.73	
Mean Overall Score															3.79		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT – I: CONNECTEDNESS**

More about Open Sets – Connected Sets – Bounded Sets and Totally Bounded Sets

**UNIT –II: COMPLETENESS, COMPACTNESS**

Complete Metric Spaces – Compact Metric Space – Continuous Functions on Compact Metric Spaces – Continuity of Inverse Functions

**UNIT – III: RIEMANN INTEGRATION**

Sets of measure zero- Definition of the Riemann Integral – Properties of the Riemann Integral – Derivatives – Rolle’s Theorem

**UNIT – IV: IMPROPER RIEMANN INTEGRATION**

The Law of the Mean – Fundamental Theorem of Calculus – Improper Integrals – Cauchy’s Principle Value.

**UNIT –V: TAYLOR’S THEOREM**

Taylor’s Theorem: Taylor’s Formula with Different Forms of Remainder – The Binomial Theorem - L’ Hospital Rule

**TEXT BOOK:**

R.Goldberg. [2000] Methods of Real Analysis. Oxford & IBH Publishing Co., New Delhi.

Unit:I Chap:6(Sec:6.1-6.4), Unit-II: Chap:6 (Sec:6.4-6.7 )

Unit-III: Chap:7(Sec: 7.1-7.6(omit 7.3)),Unit-IV: Chap:7(Sec:7.7-7.10),

Unit-V: Chap: 8(Sec:8.5-8.7)

**REFERENCE BOOKS:**

1. Tom M. Apostol [1974]. Mathematical Analysis, 2<sup>nd</sup> Edition, Addison – Wesley, New York.
2. Bartle,R.G. and Shebert [1976] Real Analysis, John Willy & Sons Inc., New York.
3. Malik, S.C and Savitha Arora [1991] Mathematical Analysis Willy Eastern Ltd, New Delhi.

<b>YEAR – III</b>	<b>COMPLEX ANALYSIS-II</b> <b>For the students admitted</b> <b>from the year 2008</b>	<b>MT616</b>
<b>SEMESTER –VI</b>		<b>Hrs / Week: 6</b>
<b>CORE-XV</b>		<b>Credit: 5</b>

**OBJECTIVES:**

The course aims to introduce the concepts of connected domains Liouville's theorem, convergence sequence and series along with Taylor's and Laurent's series, Cauchy, improper and definite integrals, linear transformations and conformal mapping.

**COURSE OUTCOMES:**

**CO1: Analyze and solve problems using connected domains Liouville's theorem.**

**CO2: Knowledge pertaining to convergence sequence and series along with Taylor's and Laurent's series.**

**CO3: Analyze and solve problems using Cauchy Residue theorems and types of singular points.**

**CO4: Knowledge pertaining to improper and definite integrals involving sines and Cosines.**

**CO5: Analyze and solve problems using linear transformations and conformal mapping.**

SEMESTER VI	COURSE CODE: <b>MT616</b>					TITLE OF THE PAPER: <b>COMPLEX ANALYSIS-II</b>										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	4	5	3	3	4	3	5	4	3	4	3	4	3	3	5	3.7	
CO2	4	5	3	4	4	4	5	4	3	4	3	4	3	4	4	3.9	
CO3	3	4	3	5	4	3	5	4	3	4	3	3	4	3	5	3.7	
CO4	4	5	4	4	3	4	5	3	3	4	4	3	4	3	4	3.8	
CO5	3	5	4	3	4	3	5	4	3	4	3	5	4	3	4	3.8	
Mean Overall Score																3.8	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT- I:**

Simply connected domains – Multiply connected domains – Cauchy integral's formula – An extension of Cauchy integral's formula – Some consequences of the extension – Liouville's theorem and the fundamental theorem of Algebra – Maximum modulus principle.

**UNIT- II:**

Convergence of sequences – Convergence of series – Taylor's Series – Proof of Taylor's theorem – Examples – Laurent Series – Proof of Laurent's Theorem – Examples – Uniqueness of Series representations.

**UNIT -III:**

Isolated singular points – Residues – Cauchy's Residue Theorem – Residue at infinity – The three types of isolated singular points – Residues at poles – Examples – Zeros of an analytic function – Zeros and poles.

**UNIT -IV:**

Evaluation of improper integrals – Examples – Improper integrals from Fourier Analysis – Jordan's lemma – Definite integrals involving sines and cosines – Argument principle – Rouché's Theorem.

**UNIT V:**

Linear transformations – The transformation  $w = 1/z$  - Linear fractional transformations – implicit form – Mappings of the upper half plane (Omit examples) Conformal mapping: Preservation of angles

**TEXT BOOK:**

"Complex Variables and Applications", James Ward Brown, Ruel V. Churchill, McGraw – Hill International Edition (2009).

Unit-I: Chap:4 (Sec:4.48-4.54)

Unit-II: Chap:5 (Sec: 5.55-5.62, 5.66), Unit-III: Chap:6 (Sec:6.68-6.76)

Unit-IV: Chap:7 (Sec:7.78-7.81, 7.85-7.87)

Unit-V: Chap:8 (Sec:8.90-8.95), Chap:9 (Sec:9.101)

**REFERENCE BOOKS:**

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1. Functions of a complex variable, J.K.Goyal , K.P. Gupta(18<sup>th</sup> Revised), Enlarged Edition 2004, Pragathi Prakashan Publishers, Meerut, UP.
  2. P. Duraipandian and Laxmi Duraipandian(1976), Complex Analysis, Emerald Publishers, Chennai.
  3. S.Ponnusamy(2000)Foundations of Complex Analysis, Narosa Publishing House, New Delhi.
  4. Murray R. Spiegel(2005), Theory and Problems of Complex Variable, Tata-McGraw Hill Edition, New Delhi.

<b>YEAR – III</b>	<b>THEORY: PROGRAMMING IN C LANGUAGE</b> <b>For the students admitted from the year 2014</b>	<b>EMT617S</b>
<b>SEMESTER –VI</b>		<b>Hrs / Week: 4</b>
<b>ELECTIVE-III</b>		<b>Credit: 2</b>

**Objective:**

To make the students abreast with the programming concepts and to master them in C Language.

**Course Outcomes:**

At the end of the Course the students should be able to exhibit

**CO1: Knowledge pertaining to C-Language Fundamentals**

**CO2: Logic using Control Statements**

**CO3: Modular Programming using Functions**

**CO4: Knowledge pertaining to arrays and structures.**

**CO5: Advanced Programming techniques using pointers and files concepts.**

SEMESTER VI	COURSE CODE: EMT617S					TITLE OF THE PAPER: PROGRAMMING IN C LANGUAGE										HOURS: 4	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	3	5	4	3	5	4	3	4	3	4	2	4	4	3.6	
CO2	3	3	3	4	5	2	5	4	2	3	3	4	2	3	4	3.2	
CO3	4	3	2	3	2	3	4	5	2	3	4	5	3	2	3	3.2	
CO4	4	4	4	2	3	4	5	3	4	3	2	4	3	5	2	3.3	
CO5	4	5	3	2	2	3	5	3	3	3	5	5	2	3	3	3.4	
Mean Overall Score															3.34		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT –I: OVERVIEW OF C**

Basic Structure of C Programs- Programming style- Executing a 'C' Programs – 'c' Tokens- Keywords and Identifiers.

**UNIT – II: CONSTANTS , VARIABLES & DATA TYPE**

Constants-Variables-Data Types- Declaration of Variables- Declaration of Storage Class- Assigning values to variables.

**UNIT – III: OPERATORS AND EXPRESSION**

Arithmetic Operators-Relational operators- Logical operators-Assignment operators-Increment and decrement operators-Conditional operators-Bitwise operators-Evaluation of Expressions-Precedence of Arithmetic operators.

**UNIT –IV:FORMATTED INPUT,OUTPUT & DECISION MAKING AND BRANCHING**

Formatted input- Formatted output- Decision making with 'IF' statement-Simple IF statement- The IF...ELSE statement-Nesting of IF...ELSE statement-The ELSE IF ladder-The switch statement – The ?: Operators- The GOTO statement.

**UNIT – V: DECISION MAKING AND LOOPING & ARRAYS**

The WHILE statement-The DO statement-The FOR statement- Jumps in LOOPS-One dimensional array-Declaration of one dimensional arrays-Initialization of one dimensional arrays-Two dimensional arrays-Multi dimensional arrays.

**TEXT BOOK:**

E. Balagurusamy [1996], "Programming in ANSI C" .Tata McGraw Hill.

Unit:I Chap:1(1.8-1.10),Chap:2 (2.3,2.4)

Unit:II Chap:2 (2.5-2.10),

Unit:III Chap: 3 (3.2-3.12),

Unit-IV Chap:4 (4.4,4.5),Chap:5 (5.2-5.9),

Unit:V Chap:6 (6.2-6.5),Chap:7(7.2-7.7)s

**REFERENCE BOOKS:**

1. V.Rajaraman [1995], "Computer Programming In C", Prentice Hall. New Delhi.
2. H.Schildt, Osborne (1994), "Teach Yourself C", McGraw Hill, New York, Mullish Cooper.
3. "The Spirit of C – An Introduction to Modern Programming", Jaico Publishing House. Delhi. 1998.
4. Yashavant Kanetkar, "Let Us C", 6<sup>th</sup> edition BPB publication.

<b>YEAR – III</b>	<b>PRACTICAL: COMPUTER PRACTICAL IN C LANGUAGE</b> <b>For the students admitted from the year 2014</b>	<b>MTP601</b>
<b>SEMESTER –VI</b>		<b>Hrs / Week: 2</b>
<b>MAIN</b>		<b>Credit: 2</b>

The following exercise shall be performed as minimum mandatory requirements [for eligibility to take the practical examination] and a RECORD of the code-listing and outputs shall be maintained by each student.

1. Assigning the ASCII value.
2. Square of numbers: Using For loop,
3. Square of numbers :While loop
4. Square of numbers: Do- while loop,
5. Square of numbers :Go to statement.
6. Printing Alphabets between two letter
7. Counting Vowels and consonants.
8. Printing Prime number between two numbers
9. Fibonacci series
10. Factorial numbers
11. Power of a value
12. Checking Palindrome in string
13. Sin(X) series
14. Cos(X) series
15. Pascal Triangle
16. Binary search
17. Matrix Transpose
18. Matrix Addition
19. Matrix Subtraction
20. Matrix Multiplication

**REFERENCE BOOKS:**

1. "The spirit if C", Mullish Cooper, Indian edition by jaico publishers, 1987.
2. "Teach yourself C", Herbert Schildt, Obsbome Megrawhill, 2<sup>nd</sup> edition 1994  
Programming in C- Schaum series.

<b>YEAR – III</b>	<b>MATHEMATICAL MODELLING (Optional Paper) For the students admitted from the year 2017</b>	<b>EMT617A</b>
<b>SEMESTER –VI</b>		<b>Hrs / Week: 6</b>
<b>ELECTIVE-III (OPTIONAL)</b>		<b>Credit::4</b>

**OBJECTIVE:**

To achieve a broad understanding of the objectives of mathematical modelling within the physical sciences

**COURSE OUTCOMES:**

The students after undergoing this course will be able to

CO1: Describe standard modelling procedures, which involve observations of a natural system using first order O.D.E

CO2: Learn to use modelling in various fields like population, economics and medicine using system of O.D.E

CO3: Analyze and apply mathematical modelling for miscellaneous model

CO4: Study mathematical modelling through Difference equation

CO5: Analyze and draw modelling through Graphs

SEMESTER VI	COURSE CODE: EMT617A					TITLE OF THE PAPER: MATHEMATICAL MODELLING										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	4	4	3	4	4	4	4	2	4	4	5	3	4	3.7	
CO2	4	3	4	3	3	4	4	3	4	2	4	4	5	3	4	3.6	
CO3	4	3	4	2	2	4	4	3	4	2	3	4	4	3	4	3.3	
CO4	4	4	4	2	3	4	4	3	3	2	3	4	3	3	4	3.3	
CO5	5	3	4	2	3	4	4	3	3	2	5	4	5	3	4	3.6	
Mean Overall Score															3.5		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT I**

Mathematical Modelling through Ordinary Differential Equations of First order : Linear Growth and Decay Models – Non-Linear Growth and Decay Models – Compartment Models – Dynamic problems – Geometrical problems.

**UNIT II**

Mathematical Modelling through Systems of Ordinary Differential Equations of First Order : Population Dynamics – Epidemics – Compartment Models – Economics – Medicine, Arms Race, Battles and International Trade – Dynamics.

**UNIT III**

Mathematical Modelling through Ordinary Differential Equations of Second Order : Planetary Motions – Circular Motion and Motion of Satellites – Mathematical Modelling through Linear Differential Equations of Second Order – Miscellaneous Mathematical Models.

**UNIT IV**

Mathematical Modelling through Difference Equations : Simple Models – Basic Theory of Linear Difference Equations with Constant Coefficients – Economics and Finance – Population Dynamics and Genetics – Probability Theory.

**UNIT V**

Mathematical Modelling through Graphs : Solutions that can be Modelled Through Graphs – Mathematical Modelling in Terms of Directed Graphs, Signed Graphs, Weighted Digraphs and Unoriented Graphs.

**TEXT BOOK(S)**

J.N. Kapur, Mathematical Modelling, Wiley Eastern Limited, New Delhi, 1988.

**REFERENCE(S)**

J.N. Kapur, Mathematical Models in biology and Medicine, EWP, New Delhi, 1985.

<b>YEAR – III</b>	<b>OPERATIONS RESEARCH For the students admitted from the year 2014</b>	<b>EMT618S</b>
<b>SEMESTER –VI</b>		<b>Hrs / Week: 6</b>
<b>ELECTIVE-IV</b>		<b>Credit: 4</b>

**OBJECTIVES**

The course aim is to introduce linear programming, transportation methods, assignment models, sequencing problem, game theory and network analysis in project planning.

**COURSE OUTCOME**

CO1: Use knowledge of operational research, LPP.

CO2:Formulate physical problems as operational research using assignment models.

CO3:Understand analogies between transportation problem, phenomena in operational research.

CO4:Classify operational research , game theory, interpret the solutions.

CO5:Interpret solutions in network analysis.

SEMESTER V1	COURSE CODE: EMT618S					TITLE OF THE PAPER: OPERATIONAL RESEARCH										HOURS: 6	CREDITS: 5
COURSE OUTCOME S	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	4	3	2	3	3	3	4	4	3	2	3	3	2	2	3	2.9	
CO2	4	3	2	2	2	3	4	4	3	2	2	3	2	3	3	2.8	
CO3	5	4	4	2	2	2	5	5	3	4	3	4	2	3	3	3.4	
CO4	4	4	3	3	3	2	5	5	4	3	2	4	2	3	2	3.3	
CO5	5	4	3	3	3	2	5	5	4	3	3	4	2	3	2	3.4	
Mean Overall Score															3.2		

This course is having **HIGH** association with programme outcomes and programme specific outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT - I : LINEAR PROGRAMMING**

Definitions of OR - formulations of Linear programming problem - Graphical methods of solution - The simplex method - Artificial variables techniques - The Big-M method - The two-phase method.

**UNIT - II : TRANSPORTATION METHODS**

Definitions of the transportation model - Formulation and solution of transportation models - North-west corner rule - Least cost method - Vogel's approximation method - Solution of transportation - MODI method.

**UNIT - III : ASSIGNMENT MODELS**

Definition of Assignment models - Mathematical representation of assignment models - Comparison with the transportation models - Solution of the assignment model - The hungarian methods for solution of the assignment models - variation of the assignment problem.

**SEQUENCING PROBLEM**

Sequencing problems - processing 'n' jobs through two machines - processing 'n' jobs through three machines - processing two jobs through 'm' machines - processing n jobs through 'm' machines.

**UNIT - IV : GAME THEORY**

Definitions - Rules for game theory - Rule 1 look for a pure strategy - Rule 2 reduce game by dominance - Rule 3 Solve for mixed strategy - Mixed strategies (2x2 games) - Mixed strategies (2xn games & mx2 games) - mixed strategies (3x3 or higher games).

**UNIT - V : NETWORK ANALYSIS IN PROJECT PLANNING**

Basic tools and techniques of project managements - Network logic - Numbering the events - Activity on node diagram - Critical path method - Programme evaluation and review technique [PERT].

**TEXT BOOK:**

Prem Kumar Gupta, D.S. Hira[2008], "Operation Research"s.

Unit-I: 1.2, 2.2, 2.3, 2.10, 2.11, 2.11.1, 2.11.2,

Unit-II: 3.2, 3.4

Unit-III:4.1-4.6, 5.1, 5.4-5.7

Unit-IV: 8.4.2 – 8.4.8

Unit-V: 14.4-14.9.

<b>YEAR – III</b>	<b>ASTRONOMY (Optional Paper) For the students admitted in the year 2012</b>	<b>EMT618A</b>
<b>SEMESTER –VI</b>		<b>Hrs / Week: 6</b>
<b>ELECTIVE-IV (OPTIONAL)</b>		<b>Credit: 5</b>

**OBJECTIVE:**

To expose the students to the basics of Spherical Trigonometry basics, Astronomical Refraction and Laws to know the Planets.

**COURSE OUTCOME:**

CO1: Students able to know the basics in Spherical Trigonometry basics

CO2: Students able to understand about Earth.

CO3: Students able to know Astronomical Refraction.

CO4: Students able to study the basics of Laws.

CO5: Students able to know about Moon.

SEMESTER VI	COURSE CODE: EMT618A					TITLE OF THE PAPER: ASTRONOMY										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	5	4	4	2	5	4	3	4	3	4	2	2	4	3.5	
CO2	3	3	3	4	2	3	5	4	2	3	3	4	2	3	4	3.1	
CO3	4	3	2	3	2	3	4	5	2	3	4	5	3	2	3	3.2	
CO4	3	4	4	2	3	2	5	3	4	3	4	4	3	4	2	3.1	
CO5	4	5	3	2	3	3	4	3	3	3	5	5	2	3	3	3.4	
Mean Overall Score															3.26		

This course is having **HIGH** association with programme outcomes and programme specific outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT-I : SPHERICAL TRIGONOMETRY**

Celestial Sphere – Diurnal motion – Simple Problems.

**UNIT-II : THE EARTH**

Zones of Earth – Terrestrial Latitudes and Longitudes – Rotation of Earth – Dip of the horizon – Twilight – Simple problems.

**UNIT-III**

Astronomical Refraction – Geocentric Parallax – Simple problems.

**UNIT-IV**

Kepler's Laws – simple problems, Equation of Time – Seasons – Calendar – Conversion of Time

**UNIT-V**

Moon : Different phases of moon – full moon – new moon – necessary and sufficient condition .

**TEXT BOOK:**

S. Kumaravelu and Susheela Kumaravelu (2004), "Astronomy", SKV Publishers, Nagarkoil.

Unit-I: (Sec: 1–86), Unit-II: (Sec: 87-91,105-109), Unit-III: (Sec: 117-133,135-144).

**REFERENCE BOOKS:**

1. L.W.Frederick and R.H.Baker (1976), "Astronomy" (10<sup>th</sup> Ed.) Van Nostrand, New York.
2. R.Jastrow and M.H. Thompson (1984), "Astronomy : Fundamentals and Frontiers", (4<sup>th</sup> Ed) John Wiley & Sons, New York.
3. H. Karttunen et. Al. (2003), "Fundamental Astronomy", (4<sup>th</sup> Ed) Springer Verlag, Berlin.
4. L. Motz and A. Duveen(1977), "Essentials of Astronomy", (2<sup>nd</sup> Ed) Columbia University Press, New York.
5. G.V. Ramachandran(1965), "A Text Book of Astronomy", (5<sup>th</sup> Edn)Published by Mrs. Rukmani Ramachandran, Tiruchirappalli.
6. M.Zeilik(2002), "Astronomy: The Evolving Universe", (9<sup>th</sup> Edn) Cambridge University Press, Cambridge.

<b>YEAR – I</b>	<b>ALLIED MATHEMATICS – I</b> <b>For the students admitted from the</b> <b>year 2014</b>	<b>AMCS101T</b>
<b>SEMESTER – I</b>		<b>HRS/WK – 8</b>
<b>ALLIED – 1</b>		<b>CREDIT – 6</b>

**(For B.Sc Computer Science)****OBJECTIVES**

This subject covers the topics Theory of equations, matrices, differential calculus, Integral calculus and vector analysis, to explore the fundamental concepts of Mathematics.

**COURSE OUTCOMES:**

**CO1: Knowledge pertaining to polynomials equations in varies field.**

**CO2: Able to find solutions of transformation of equation by increasing or decreasing roots.**

**CO3: Knowledge pertaining to consistency of equations of matrices and Eigen roots and**

SEMESTER I	COURSE CODE: AMCS101T					TITLE OF THE PAPER: ALLIED MATHEMATICS – I										HOURS: 8	CREDITS: 5
	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
COURSE OUTCOMES	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	4	4	3	4	3	3	4	4	3	4	4	5	3	3	4	3.7	
CO2	3	5	3	3	3	4	5	4	3	4	4	5	3	3	4	3.7	
CO3	5	4	3	3	4	5	4	3	4	5	4	4	3	4	5	4.0	
CO4	4	3	4	3	4	3	5	4	4	5	4	3	4	4	4	3.9	
CO5	3	5	4	2	5	3	5	4	4	5	4	4	3	4	5	4.0	
Mean Overall Score															3.9		

**Eigen vectors.**

**CO4: Knowledge pertaining to expansions of  $\sin\theta$ ,  $\cos\theta$ ,  $\tan\theta$  and Hyperbolic functions.**

**CO5: Knowledge pertaining to find solutions of nth- derivatives and radius of curvature.**

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

**OBJECTIVES**

This subject covers the topics Theory of equations, matrices, differential calculus, Integral calculus and vector analysis, to explore the fundamental concepts of Mathematics.

**UNIT-I: THEORY OF EQUATIONS**

Polynomial Equations with real Coefficients – Irrational roots – Complex roots – Symmetric functions of roots.

**UNIT-II: THEORY OF EQUATIONS(CONTD)**

Transformation of equation by increasing or decreasing roots by a constant – Reciprocal equations – Newton's method to find a root approximately (without proof) .

**UNIT-III: MATRICES**

Rank of a matrix – Consistency of equations – Eigen roots and Eigen vectors – Cayley – Hamilton's theorem [without proof] – Verification and computation of inverse matrix.

**UNIT-IV: TRIGONOMETRY**

Expansions of  $\sin^n \theta$ ,  $\cos^n \theta$ ,  $\sin n\theta$ ,  $\cos n\theta$ ,  $\tan n\theta$  – Expansions of  $\sin \theta$ ,  $\cos \theta$ ,  $\tan \theta$  in terms of  $\theta$  – Hyperbolic and inverse hyperbolic functions – Logarithms of complex numbers.

**UNIT-V: DIFFERENTIAL CALCULUS**

n-th derivatives – Leibnitz theorem [without proof] and its applications – Jacobians – Concepts of polar co-ordinates – Curvature and radius curvature in Cartesian co-ordinates.

**TEXT BOOK:**

P. Duraipandian and S. Udayabaskaran. 2005, "Allied Mathematics", Vol I & II. Chennai: Muhil Publishers.

Unit-I: Chap:3(3.1,3.1.1,3.1.2,3.2,3.2.1)

Unit-II: Chap:3(3.2.2,3.3,3.4.1), Unit-III: Chap:4(4.4,4.5,4.5.2,4.5.3),

Unit-IV: Chap:6 (6.1,6.1.1-6.1.3,6.2,6.2.1-6.2.3,6.3,6.4),

Unit-V: Chap:1(1.1.1,1.1.2,1.2,1.4.3,1.4).

**REFERENCE BOOKS:**

1. P. Balasubramanian and K. G. Subramanian. 1997, "Ancillary Mathematics", Vol I & II. New Delhi: Tata McGraw Hill.
2. S.P.Rajagopalan and R.Sattanathan 2005, "Allied Mathematics", Vol I & II. New Delhi: Vikas Publications.
3. P. R. Vittal(2003), "Allied Mathematics", Chennai: Marghan Publications.
4. P.Kandhasamy, K. Thilagavathy(2003), "Allied Mathematics", Vol I & II. New Delhi: S. Chand & Co Ltd.

<b>I – BCA</b>	<b>MATHEMATICAL FOUNDATIONS</b> <b>For the students admitted from the year 2008</b>	<b>AMTCA101</b>
<b>SEMESTER - I</b>		<b>HRS/WK – 5</b>
<b>ALLIED – 1</b>		<b>CREDIT – 5</b>

**(For B.C.A. I – Year)**

**OBJECTIVE:**

To learn how to apply fundamental mathematical tools and techniques used in most fields of science and mathematics

**COURSE OUTCOMES:**

The students after undergoing this course will be able to

CO1: Understand operators and solve problems using operators

CO2: Know the concept of set theory, relation and function

CO3: Solve problems using permutation and combination

CO4: Understand more about matrices and solve problems using matrices

CO5: Learn characteristic roots and characteristic vectors and solve problems

SEMESTER I	COURSE CODE: AMTCA101					TITLE OF THE PAPER: MATHEMATICAL FOUNDATION											HOURS: 5	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)											MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10			
CO1	4	3	3	3	4	4	4	4	3	3	5	3	3	1	4		3.4	
CO2	3	4	3	4	3	4	5	4	3	4	3	3	3	2	5		3.5	
CO3	4	3	4	3	3	3	4	4	3	3	4	5	3	1	5		3.47	
CO4	5	5	4	5	4	3	4	5	3	3	3	5	3	2	4		3.87	
CO5	4	5	4	3	4	4	5	4	3	3	3	3	3	1	5		3.6	
Mean Overall Score																3.57		

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT –I: LOGICAL OPERATORS**

Conjunction, disjunction, negation, conditional and bi-conditional operators. Converse, inverse, contra-positive, logically equivalent, tautology and contradiction, arguments and validity of arguments.

**UNIT-II: SET THEORY**

Set theory, Relations and Functions.

**UNIT –III: PERMUTATION & COMBINATION**

Binary operations, Permutations and Combinations, Mathematical induction.

**UNIT –IV: MATRICES**

Types of matrices, operations on matrices, simple problems, singular and non-singular matrices, adjoint of a matrix, inverse of a matrix, symmetric and skew-symmetric, Hermitian and skew-Hermitian, orthogonal and unitary matrices, rank of a matrix.

Consistency of a system of linear equations by

1. Cramer's rule
2. Matrix inversion method.
3. Rank method.

**UNIT –V: MATRIX (CONTD)**

Characteristic roots and characteristic vectors, and problems on Cayley-Hamilton theorem.

**APPLICATION OF MATRICES:** Matrix of linear transformation: Reflection about x -axis, y axis, the line  $y = x$ , and the line  $y = -x$ , rotation about the origin through an angle  $\theta$ , expansion and compression, shears, translation, successive transformation.

**TEXT BOOKS:**

“Mathematical Foundations”, P.R.Vittal, Margham Publications, Chennai.

Unit-I: Chapter 1(Pages : 1.1 -1.50),

Unit-II: Chapter:2&3&4 (Pages: 2.1- 2.38 &3.1 -3.25 & 4.1-4.35),

Unit-III:Chapter:6& 7(Pages:6.1 -6.10 & 7.1-7.53),

Unit-IV:Chapter 8(Pages:8.1 to 8.97),

Unit-V: Chapter:8&9 (Pages:8.97-8.140 & 9.1-9.7).

**REFERENCE BOOKS:**

1. “Discrete Mathematics”, Second edition, Seymour Lipschutz & Marc Lipson, Schaum’s outlines, Tata McGraw-Hill.
2. Discrete Mathematics, B.S. Vatsa, Wishwa Prakashan.

<b>YEAR – I</b>	<b>ALLIED MATHEMATICS – I</b> <b>For the students admitted from the year</b> <b>2015</b>	<b>AMT101Q</b>
<b>SEMESTER – I</b>		<b>HRS/WK - 8</b>
<b>ALLIED- 1</b>		<b>CREDIT – 6</b>

**(For B.Sc. Physics & Chemistry)**

**Objectives:**

1. To acquire knowledge on finding roots of the complex equation.
2. To improve their ability on applications of matrices and calculus.

**COURSE OUTCOMES:**

**CO1: Attains knowledge on finding roots for polynomial, irrational, complex equations.**

**CO2: develops the skill of transformation, approximation and reciprocal on equations.**

**CO3: adopts techniques in solving problem involving Matrices**

**CO4: provides skills on finding curvature and radius of curvature in Cartesian and polar co-ordinates.**

**CO5: enables to understand the applications of integration in real life situation.**

SEMESTER I	COURSE CODE: AMT101T					TITLE OF THE PAPER: ALLIED MATHEMATICS – I										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	4	4	4	3	3	3	4	4	4	4	3	3	3	3	4	3.5	
CO2	3	3	3	3	3	4	3	4	4	3	3	4	3	3	3	3.3	
CO3	3	3	4	3	4	3	3	3	4	3	4	3	4	3	3	3.3	
CO4	4	4	3	4	4	3	3	3	3	3	4	3	3	3	4	3.4	
CO5	3	3	3	4	4	4	4	4	3	4	3	3	3	3	3	3.4	
Mean Overall Score																3.4	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT-I: THEORY OF EQUATIONS**

Polynomial Equations with real Coefficients – Irrational roots – Complex roots – Symmetric functions of roots.

**UNIT-II: THEORY OF EQUATIONS(CONTD)**

Transformation of equation by increasing or decreasing roots by a constant – Reciprocal equations – Newton’s method to find a root approximately (without proof) .

**UNIT-III: MATRICES**

Characteristic equation of a square matrix– Eigen roots and eigen vectors – Cayley – Hamilton theorem [without proof] – Verification and computation of inverse matrix-

**UNIT-IV: DIFFERENTIAL CALCULUS**

n-th derivatives – Leibnitz theorem [without proof] and applications – Jacobians– Curvature and radius of curvature in Cartesian co-ordinates and polar co-ordinates.

**UNIT-V: APPLICATION OF INTEGRATION**

Evaluation of double, triple integrals – Simple applications to area, volume and centroid.

**TEXT BOOK:**

P. Duraipandian and Dr. S. Udayabaskaran. 1997, “Allied Mathematics” , Vol I & II. Chennai: Muhil Publishers.

Unit-I: Sec(3.1,3.1.1,3.1.2,3.2,3.2.1),

Unit-II:Sec(3.2.2,3.3,3,3.4),

Unit-III:Sec(1.1.1,1.1.2,1.2,1.4.3),

Unit-IV:Sec(2.7,4.1,4.1.1,4.2),

Unit-V: Chap:3(3.4,3.4.1,3.5,3.5.1,3.5.2,3.6),

**REFERENCE BOOKS:**

1. P. Balasubramanian and K. G. Subramanian. 1997, "Ancillary Mathematics", Vol I & II. New Delhi: Tata McGraw Hill.
2. S.P.Rajagopalan and R.Sattanathan(2005), "Allied Mathematics", Vol I & II. New Delhi: Vikas Publications.
3. P. R. Vittal (2003), "Allied Mathematics",Chennai: Marghan Publications.  
P.Kandhasamy, K. Thilagavathy (2003), "Allied Mathematics" Vol I & II. New

<b>YEAR – I</b>	<b>ALLIED MATHEMATICS – II</b> <b>For the students admitted</b> <b>from the year 2019</b>	<b>19AMCS22</b>
<b>SEMESTER – II</b>		<b>HRS/WK – 8</b>
<b>ALLIED – 2</b>		<b>CREDIT – 6</b>

**(For B.Sc Computer Science)**

**OBJECTIVES**

This subject covers the topics Laplace Transform, Vector differentiation & Integration, Finite Differences, to explore the fundamental concepts of Mathematics.

**Course Outcome:**

At the end of the course students will be able to

CO1: To study the basic concept of Game Theory in Operation Research

CO2: Solve the Assignment models in different applications

CO3: To study the basic concept of Laplace Transform

CO4: Compute scalar and vector product, gradient and curl of functions

CO5: Find interpolating data using Lagrange and Newton's formula.

SEMESTER I	COURSE CODE: AMCS202T					TITLE OF THE PAPER: ALLIED MATHEMATICS II										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	4	3	3	3	5	4	2	4	4	4	3	2	4	3.47	
CO2	3	4	4	3	3	3	5	4	2	4	4	4	3	2	4	3.47	
CO3	3	4	4	3	3	3	5	5	2	4	4	4	3	2	4	3.5	
CO4	3	4	4	3	3	3	5	4	2	4	4	4	3	2	4	3.47	
CO5	3	4	4	3	3	3	5	5	2	4	4	4	5	3	2	4	3.6
Mean Overall Score																3.5	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT-I: GAME THEORY**

Two Person Zero Sum Game-Basic Terms-Maximum and Minimum Principal-Games Without Saddle points –Mixed Strategies-Graphical Solution of  $2 \times n$  and  $m \times 2$  games-Dominance Property.

**UNIT-II: ASSIGNMENT MODEL:**

Definition of Assignment Model- Formulation and Solution of Assignment Model-Special Cases in Assignment Model

**UNIT-III:LAPLACE TRANSFORM:**

Laplace Transform of Standard functions and Properties- Inverse Laplace Transform.

**UNIT-IV: VECTOR DIFFERENTIATION**

Scalar point functions-Vector point functions-Gradient-Divergence-Curl-Directional Derivatives-Unit to normal to a surface.

**UNIT-V: FINITE DIFFERENCES**

Operator E, Relation between  $\Delta, \nabla$  and E – Interpolation – Newton – Gregory forward & backward formulae for interpolation-Lagrange's interpolation formula for unequal intervals(without proof) .

**TEXT BOOK:**

1. Dr.S.J Venkatesan (2018) "Operation Research" Sri Krishna Publication
2. P. Duraipandian and S. Udayabaskaran(1997), "Allied Mathematics", Vol I & II. Chennai.Muhil Publishers.

Unit-I: Chapter-9: Page:9.1-9.9,9.19-9.28

Unit-2: Chapter 4: Page 4.1-4.28

Unit-III: Sec(7.1.1-7.1.4,7.2,7.2.1,7.2.2,7.2.3),

Unit-IV:Sec(8.1,8.1.1,8.2,8.3,8.3.1,8.3.2,8.4,8.4.1,8.4.2,8.4.3,8.4.4),

Unit-V:Sec(5.1, 5.2)

**REFERENCE BOOKS:**

1. P. Balasubramanian and K. G. Subramanian.1997, "Ancillary Mathematics", Vol I & II. New Delhi: Tata McGraw Hill.
2. S.P.Rajagopalan and R.Sattanathan(2005), "Allied Mathematics", Vol I & II. New Delhi: Vikas Publications.
3. P. R. Vittal (2003), "Allied Mathematics",Chennai: Marghan Publications.
4. P.Kandhasamy, K. Thilagavathy (2003), "Allied Mathematics" Vol I & II. New Delhi: S. Chand & Co Ltd.

<b>YEAR – I</b>	<b>ALLIED MATHEMATICS – II</b> <b>For the students admitted</b> <b>from the year 2015</b>	<b>AMT202T</b>
<b>SEMESTER – II</b>		<b>HRS/WK – 8</b>
<b>ALLIED- 1I</b>		<b>CREDIT – 6</b>

**(For B.Sc Physics & Chemistry)**

**Objectives:**

1. to expand trigonometric functions and also to find partial differential equations
2. To learn about vector differentiations and integrations and to familiar with physical interpretation of divergence and curl of a vector

**COURSE OUTCOMES:**

CO1: Attains knowledge on finding the expansions of trigonometric and hyperbolic functions

CO2: provides a basic knowledge of Partial Differential equations and develops knowledge on handle practical problems.

CO3: adopts techniques in solving problems involving vector and scalar functions

CO4: provides skills on finding derivatives and gradients on vector differentiation and integration.

CO5: enables to understand the applications of differentiation and integration in real

SEMESTER II	COURSE CODE: AMT202S					TITLE OF THE PAPER: ALLIED MATHEMATICS – II										HOURS: 6	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	4	3	4	3	3	4	4	3	4	4	3	4	3	3	3	3	3.5
CO2	4	4	4	3	4	3	4	3	3	3	4	3	3	3	4	4	3.5
CO3	3	3	3	4	4	4	3	3	4	3	3	3	4	3	4	4	3.4
CO4	3	3	3	4	3	3	3	3	3	4	3	3	3	3	3	3	3.1
CO5	4	4	4	3	3	3	3	3	4	3	3	3	3	4	4	4	3.4
Mean Overall Score																3.4	

life situation.

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5

Rating	Very Poor	Poor	Moderate	High	Very High
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**UNIT-I:TRIGONOMETRY**

Expansions of  $\sin^n \theta$ ,  $\cos^n \theta$ ,  $\sin \theta$ ,  $\cos \theta$ ,  $\tan \theta$  – Expansions of  $\sin \theta$ ,  $\cos \theta$ ,  $\tan \theta$  in terms of  $\theta$  – Hyperbolic and inverse hyperbolic functions – Logarithms of complex numbers.

**UNIT-II:PARTIAL DIFFERENTIAL EQUATIONS**

Formation-complete integrals and general integrals-Four standard types-Lagrange's equations.

**UNIT-III: VECTOR DIFFERENTIATION**

Vector functions- Derivative of a vector function- Scalar and vector point functions- Gradient of a scalar point function- Gradient- Directional derivatives –Unit vector normal to a surface – angle between the surfaces-divergence, curl.

**UNIT-IV: VECTOR INTEGRATION**

Green's theorem in the plane- Gauss divergence theorem- Stoke's theorem [without proofs].

**UNIT-V: FINITE DIFFERENCES**

Operator E, Relation between  $\Delta$ ,  $\nabla$  and E – Interpolation – Newton – Gregory forward & backward formulae for interpolation-Lagrange's interpolation formula for unequal intervals(without proof) .

**TEXT BOOK:**

P. Duraipandian and S. Udayabaskaran(1997), "Allied Mathematics", Vol I & II. Chennai: Muhil Publishers.

Unit-I: Chap: 6 (6.1,6.1.1-6.1.3,6.2,6.2.1-6.2.3,6.3,6.4),

Unit-II: Chap:6 (6.1,6.1.1,6.2,6.3,6.4),

Unit-III:Sec(8.1,8.1.1,8.2,8.3,8.3.1,8.3.2,8.4,8.4.1,8.4.2,8.4.3,8.4.4),

Unit-IV:Sec(8.6.1, - 8.6.3),

Unit-V:Sec(5.1,5.2).

**REFERENCE BOOKS:**

1. P. Balasubramanian and K. G. Subramanian. 1997, "Ancillary Mathematics", Vol I & II. New Delhi: Tata McGraw Hill.

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2. S.P.Rajagopalan and R.Sattanathan(2005), "Allied Mathematics", Vol I & II. New Delhi: Vikas Publications.
  3. P. R. Vittal (2003), "Allied Mathematics", Chennai: Marghan Publications.
  4. P.Kandhasamy, K. Thilagavathy (2003), "Allied Mathematics" Vol I & II. New

<b>II – BCA</b>	<b>NUMERICAL METHODS For the students admitted in the year 2008</b>	<b>AMTCA302</b>
<b>SEMESTER - III</b>		<b>HRS/WK – 8</b>
<b>Allied-2</b>		<b>CREDIT – 5</b>

**OBJECTIVES**

The course aims to introduce the concepts of Finite differences, Central differences, Interpolation for unequal intervals, Inverse interpolation and Solutions of simultaneous linear equations.

**COURSE OUTCOMES:**

CO1: develops the skill of calculation through forward and backward interpolations

CO2: learns to solve by central difference methods

CO3: knows to calculate interpolation for unequal intervals

CO4: collectively solves the solutions of simultaneous equations using different methods.

CO5: enables to understand the applications of integration in real life situation.

SEMESTER III	COURSE CODE: AMTCA302					TITLE OF THE PAPER: NUMERICAL METHODS										HOURS: 8	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	3	4	4	3	4	3	3	4	4	3	3	3	4	3	3	3.4	
CO2	3	3	4	3	4	3	4	4	4	3	4	3	4	3	4	3.5	
CO3	3	3	4	3	4	3	4	3	3	3	4	3	4	4	3	3.4	
CO4	3	3	3	4	4	3	4	3	3	3	3	3	4	3	3	3.3	
CO5	3	3	4	4	4	3	3	3	4	4	3	3	3	4	4	3.5	
Mean Overall Score																3.4	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

**UNIT- I: FINITE DIFFERENCES**

First and higher order differences-forward differences and Back ward differences-Properties of operators-Differences of a Polynomial-Factorial Polynomials – Operator E, Relation between  $\Delta, \nabla$  and E – Interpolation – Newton – Gregory forward & backward formulae for interpolation(without proof) – simple problems.

**UNIT-II: CENTRAL DIFFERENCES**

Central difference Operators – Central differences formulae: Gauss Forward and Backward formulae(without proof) – simple problems – Sterling's formula(without proof) – simple problems – Bessel's formula(without proof) – simple problems.

**UNIT – III: INTERPOLATING FOR UNEQUAL INTERVALS AND INVERSE INTERPOLATION**

Divided differences – Newton's divided differences formula and Lagrange's formula[without proof] – Estimating the Missing terms [with one or more missing values] - Lagrange's method and Reversion of series method [Using Newton's forward formula only]..

**UNIT – IV: SOLUTION OF SIMULTANEOUS EQUATION**

Gauss elimination method – matrix inversion method – Gauss – Jordan Method, Gauss – Seidal method – Crout's method [Three unknowns only].

**UNIT – V: SOLUTION OF DIFFERENTIAL EQUATION**

Solving second order differential equation, Runge kutta method, Euler's modified method, Euler's method, Adam's method.

**TEXT BOOKS:**

1. A.Singaravelu [2004], "Numerical Methods", Meenakshi Agency, Chennai
2. M.K.Venkataraman(1992), "Numerical methods for Science and Engineering", National Publishing Company., Chennai.

**REFERENCE BOOKS :**

1. S.Arumugham(2003), "Numerical Methods", New Gamma Publishing, Palayamkottai.
2. H.C.Saxena(1991), "Finite differences and Numerical Analysis", S.Chand & Co. Delhi
3. B.D.Gupta(2001), "Numerical Analysis", Konark Pub. Ltd., Delhi
4. P.Kandasamy, K.Thilagavathy (2003), "Calculus of Finite difference & Numerical Analysis", S.Chand & Company Ltd., New Delhi-55.

<b>II – BCA</b>	<b>RESOURCE MANAGEMENT TECHNIQUES</b> <b>For the students admitted from the year</b> <b>2015</b>	<b>AMCA403S</b>
<b>SEMESTER - IV</b>		<b>HRS/WK – 5</b>
<b>ALLIED -3</b>		<b>CREDIT – 5</b>

**OBJECTIVE:**

To expose the students to the basics of LPP, Transportation Problem, Sequencing Problem, Game Theory and Networks

**COURSE OUTCOME:**

CO1: Students able to know the basics in Operation Research and make the Model.

CO2: Students able to understand Transportation Method.

CO3: Students able to do the problems in Job problems.

CO4: Students able to study the basics to solve the Game problems

CO5: Students able to know the Networks and Relations.

SEMESTER IV	COURSE CODE: AMTCA403S					TITLE OF THE PAPER: RESOURCE MANAGEMENT TECHNIQUES										HOURS: 5	CREDITS: 5
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										S MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	3	4	4	2	5	4	3	4	3	4	2	2	4	3.4	
CO2	3	3	3	4	2	2	5	4	2	3	3	4	2	3	4	3.1	
CO3	4	3	2	3	2	3	4	5	2	3	4	5	3	2	3	3.2	
CO4	3	4	4	2	3	2	5	3	4	3	2	4	3	3	2	3.0	
CO5	4	5	3	2	2	3	5	3	3	3	5	5	2	3	3	3.4	
<b>Mean Overall Score</b>															<b>3.22</b>		

This course is having **HIGH** association with programme outcomes and programme specific outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT –I: BASIC CONCEPT OF OR**

Definitions of OR-Linear programming problem-Graphical solution -Simplex method – Artificial variables techniques – Big M method .

**UNIT-II:TRANSPORTATION MODEL**

Definition , Formulation of Transportation-North-west corner method –Matrix minima method- Vogel’s Approximation method –solution of Transportation- modi’s method

**ASSIGNMENT MODELS:** Definition of Assignment models- Formulation and solution of Assignment models-Special cases in Assignment problems

**UNIT-III:SEQUENCING PROBLEM**

Basic term used in sequencing-Processing  $n$  jobs through two machines- Processing  $n$  jobs through three machines- Processing two jobs through  $k$  machines.

**UNIT –IV:GAME THEORY**

Two person zero sum game-Basic terms –Maximin and Minimax principle- Games without saddle point –Mixed strategies– graphical solution of  $2 \times n$  and  $m \times 2$  games -Dominance property.

**UNIT –V:PERT/CPM NETWORKS:**

Introduction –Network and basic component –Logical sequencing -Fulkerson’s rule of the Network construction –Critical path Analysis &PERT analysis- PERT-Distinction between PERT and CPM .

**TEXT BOOKS:**

Kanti Swaru, Gupta P. K. and Manmohan[1999], “Operations Research”, Sulthan Chand & Sons., Delhi.

**REFERENCE BOOKS:**

1. Gupta P. K and Hira D. S. [2000], “Problems in Operations Research”, Sulthan Chand & Sons., Delhi.
2. J. K. Sharma, [2001], “Operations Research Theory and Applications”, Macmillan, Delhi
3. Taha H. A.[2003], “Operations Research” , Macmillan Publishing Company, New York.
4. P.R. Vittal [2003], “Operations Research” , Margham Publications, Chennai.

<b>II – B.Com</b>	<b>BUSINESS MATHEMATICS</b> <b>For the students admitted from the year</b> <b>2014</b>	<b>AMCM401</b>
<b>SEMESTER - IV</b>		<b>HRS/WK – 5</b>
<b>ALLIED</b>		<b>CREDIT – 4</b>

**(For B.COM. II – Year)****OBJECTIVES:**

The course aim is to introduce the concepts of operations on set and applications, to study the characteristic of analytical geometry, differential calculus, matrices and commercial arithmetic.

**COURSE OUTCOMES:**

CO1: Know the basic concepts of operations on sets, relations and functions.

CO2: Learn to form an equations of straight line, distance, slope and interpretations.

CO3: Able to find limit, continuity, average and marginal concepts using

differential calculus. CO4: Able to understand the operations on matrices and to find solution of system

SEMESTER IV	COURSE CODE: AMCM401					TITLE OF THE PAPER: BUSINESS MATHEMATICS										HOURS: 5	CREDITS: 4
COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10		
CO1	3	5	2	2	4	3	5	5	2	4	3	3	3	3	4	3.4	
CO2	4	5	3	4	3	4	4	3	5	4	3	4	5	3	5	3.9	
CO3	3	4	3	3	2	3	5	2	4	3	2	3	4	2	4	3.1	
CO4	3	5	3	4	2	5	4	3	3	4	3	3	5	3	4	3.6	
CO5	4	4	3	4	3	3	5	4	4	4	3	4	4	4	4	3.8	
Mean Overall Score															3.5		

of linear equations.

CO5: Enable to calculate percentage, simple and compound interests.

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	$0 \leq \text{rating} \leq 1$	$1.1 \leq \text{rating} \leq 2$	$2.1 \leq \text{rating} \leq 3$	$3.1 \leq \text{rating} \leq 4$	$4.1 \leq \text{rating} \leq 5$
Rating	Very Poor	Poor	Moderate	High	Very High

### UNIT I:SET THEORY

Basic concepts – Subsets – Operations on sets Applications – Cartesian Product – Relation – Properties of relation- Functions.

### UNIT – II:ANALYTICAL GEOMETRY

Distance – Slope – Equation of Straight line – Interpretation – Break even analysis – Parabolas.

**UNIT – III: DIFFERENTIAL CALCULUS**

Limits – Continuity – Average & Marginal concepts – Differential coefficient concepts – Simple applications to Economics.

**UNIT – IV: MATRICES**

Addition of matrices – Scalar multiplication – Multiplication of a matrix by a matrix – Inverse of a matrix – Solution of a system of linear equation – Input output Analysis

**UNIT – V: COMMERCIAL ARITHMETIC**

Percentages – Simple and Compound interests – Arithmetic and Geometric Series – Simultaneous Linear equations.

**TEXT BOOK :**

“An Introduction to Business Mathematics”, V. Sundaresan, S. D. Jaya Seelan, S. Chand & Company Ltd, New Delhi (2003).

Unit-I: Chap:2 (Sec:2.1 – 2.7),

Unit-II: Chap:1 (Sec:1.2-1.4, 1.6-1.8),

Unit-III: Chap:3 (Sec:3.1, 3.2, 3.4, 3.5, 3.11),

Unit-IV: Chap:8 (8.2-8.7),

Unit-V: Chap:7 (7.1, 7.2, 7.3, 7.5).

**REFERENCE BOOKS:**

1. “Business Mathematics”, Qazi Zameeruddin, V. K. Kahanna, S. K. Bhambri, Vikas Publishing Pvt Ltd, New Delhi (1995).
2. “Business Mathematics”, V. K. Kapoor, S. Chand & Company Ltd, New Delhi (1994).

<b>II – BBM</b>	<b>MATHEMATICS FOR COMPETITIVE EXAMS</b> <b>For the students admitted from the year</b> <b>2014</b>	<b>AMBM401</b>
<b>SEMESTER - IV</b>		<b>HRS/WK – 5</b>
<b>ALLIED</b>		<b>CREDIT – 4</b>

**(For BBM. II – Year)**

**OBJECTIVES:**

The course aim is to introduce the concepts of operations on set and applications, to study the characteristic of analytical geometry, differential calculus, matrices and commercial arithmetic.

**COURSE OUTCOMES:**

**CO1: Know the basic concepts of operations on sets, relations and functions.**

**CO2: Learn to form an equations of straight line, distance, slope and interpretations.**

**CO3: Able to find limit, continuity, average and marginal concepts using differential calculus.**

**CO4: Able to understand the operations on matrices and to find solution of system of linear equations.**

<b>SEMESTER IV</b>	<b>COURSE CODE:</b> <b>AMBM401</b>	<b>TITLE OF THE PAPER: MATHEMATICS FOR COMPETITIVE EXAMS</b>	<b>HOURS:</b> <b>5</b>	<b>CREDITS:</b> <b>4</b>
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**CO5: Enable to calculate percentage, simple and compound interests.**

COURSE OUTCOMES	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										MEAN SCORE OF CO'S
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10	
CO1	3	5	2	2	4	3	5	5	2	4	3	3	3	3	4	3.4
CO2	4	5	3	4	3	4	4	3	5	4	3	4	5	3	5	3.9
CO3	3	4	3	3	2	3	5	2	4	3	2	3	4	2	4	3.1
CO4	3	5	3	4	2	5	4	3	3	4	3	3	5	3	4	3.6
CO5	4	4	3	4	3	3	5	4	4	4	3	4	4	4	4	3.8
Mean Overall Score															3.5	

This Course is having **HIGH** association with Programme Outcomes and Programme Specific Outcomes.

<b>Association</b>	<b>1%-20%</b>	<b>21%-40%</b>	<b>41%-60%</b>	<b>61%-80%</b>	<b>81%-100%</b>
<b>Scale</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
<b>Interval</b>	<b>0&lt;=rating&lt;=1</b>	<b>1.1&lt;=rating&lt;=2</b>	<b>2.1&lt;=rating&lt;=3</b>	<b>3.1&lt;=rating&lt;=4</b>	<b>4.1&lt;=rating&lt;=5</b>
<b>Rating</b>	<b>Very Poor</b>	<b>Poor</b>	<b>Moderate</b>	<b>High</b>	<b>Very High</b>

**UNIT I:SET THEORY**

Basic concepts – Subsets – Operations on sets Applications – Cartesian Product – Relation – Properties of relations – Functions.

**UNIT – II:ANALYTICAL GEOMETRY**

Distance – Slope – Equation of Straight line – Interpretation – Break even analysis – Parabolas.

**UNIT – III:DIFFERENTIAL CALCULUS**

Limits – Continuity – Average & Marginal concepts – Differential coefficient concepts – Simple applications to Economics.

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Percentages – Simple and Compound interests – Arithmetic and Geometric Series – Simultaneous Linear equations.

**TEXT BOOK :**

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Unit-I: Chap:2(Sec:2.1 – 2.7),

Unit-II: Chap:1(Sec:1.2-1.4,1.6-1.8),

Unit-III: Chap:3(Sec:3.1,3.2,3.4,3.5,3.11),

Unit-IV: Chap:8 (8.2-8.7),

Unit-V: Chap:7(7.1,7.2,7.3,7.5).

**REFERENCE BOOKS:**

1. “Business Mathematics”, Qazi Zameeruddin, V. K. Kahanna, S. K. Bhambri, Vikas Publishing Pvt Ltd, New Delhi (1995).
2. “Business Mathematics”, V. K. Kapoor, S. Chand & Company Ltd, New Delhi (1994).

<b>II – BBA(CA)</b>	<b>RESOURCE MANAGEMENT TECHNIQUES</b> <b>For the students admitted from the year 2017</b>	<b>17ABM33</b>
<b>SEMESTER - IV</b>		<b>HRS/WK - 5</b>
<b>ALLIED -1</b>		<b>CREDIT – 4</b>

**OBJECTIVE:**

To expose the students to the basics of LPP, Transportation Problem, Sequencing Problem, Game Theory and Networks

**COURSE OUTCOME:**

CO1: Students able to know the basics in Operation Research and make the Model.

CO2: Students able to understand Transportation Method.

CO3: Students able to do the problems in Job problems.

CO4: Students able to study the basics to solve the Game problems

CO5: Students able to know the Networks and Relations.

SEMESTER IV	COURSE CODE: AMTCA403S					TITLE OF THE PAPER: RESOURCE MANAGEMENT TECHNIQUES										HOURS: 5	CREDITS: 5
COURSE OUTCOME S	PROGRAMME OUTCOMES(PO)					PROGRAMME SPECIFIC OUTCOMES(PSO)										S MEAN SCORE OF CO'S	
	PO 1	PO 2	PO 3	PO 4	PO 5	PSO 1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9	PSO10		
CO1	3	4	3	4	4	2	5	4	3	4	3	4	2	2	4	3.4	
CO2	3	3	3	4	2	2	5	4	2	3	3	4	2	3	4	3.1	
CO3	4	3	2	3	2	3	4	5	2	3	4	5	3	2	3	3.2	
CO4	3	4	4	2	3	2	5	3	4	3	2	4	3	3	2	3.0	
CO5	4	5	3	2	2	3	5	3	3	3	5	5	2	3	3	3.4	
<b>Mean Overall Score</b>															<b>3.22</b>		

This course is having **HIGH** association with programme outcomes and programme specific outcomes.

Association	1%-20%	21%-40%	41%-60%	61%-80%	81%-100%
Scale	1	2	3	4	5
Interval	0<=rating<=1	1.1<=rating<=2	2.1<=rating<=3	3.1<=rating<=4	4.1<=rating<=5
Rating	Very poor	Poor	Moderate	High	Very High

**UNIT –I: BASIC CONCEPT OF OR**

Definitions of OR-Linear programming problem-Graphical solution -Simplex method – Artificial variables techniques – Big M method .

**UNIT-II:TRANSPORTATION MODEL**

Definition , Formulation of Transportation-North-west corner method –Matrix minima method- Vogel’s Approximation method –solution of Transportation-modi’s method

**ASSIGNMENT MODELS:** Definition of Assignment models- Formulation and solution of Assignment models-Special cases in Assignment problems

**UNIT-III:SEQUENCING PROBLEM**

Basic term used in sequencing-Processing  $n$  jobs through two machines- Processing  $n$  jobs through three machines- Processing two jobs through  $k$  machines.

**UNIT –IV:GAME THEORY**

Two person zero sum game-Basic terms –Maximin and Minimax principle-Games without saddle point –Mixed strategies– graphical solution of  $2 \times n$  and  $m \times 2$  games -Dominance property.

**UNIT –V:PERT/CPM NETWORKS:**

Introduction –Network and basic component –Logical sequencing -Fulkerson’s rule of the Network construction –Critical path Analysis &PERT analysis- PERT-Distinction between PERT and CPM .

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Kanti Swaru, Gupta P. K. and Manmohan[1999], “Operations Research”, Sulthan Chand & Sons., Delhi.

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3. Taha H. A.[2003], “Operations Research” , Macmillan Publishing Company,

New York.

4. P.R. Vittal [2003], "Operations Research" , Margham Publications, Chennai.

### QUESTION PATTERN

**Time: 3Hrs**

**Max. Marks:75**

**Section – A**

**5x2=10 (Answer ALL Questions)**

**(Each unit have one question)**

**Section – B**

**3x5=15 (Answer any THREE Questions (Out of five))**

**(Each unit have one question)**

**Section – C**

**5x10=50 (Answer ALL Questions (Either or Type))**

**(Each unit have two questions)**

### QUESTION PATTERN (ALLIED MATHEMATICS –I &II)

Since the students admitted from the year -2017 for computer science  
,Physics and Chemistry.

**Time: 3Hrs**

**Max. Marks:75**

**Section – A**

**Answer ALL Questions**

**5x3=15 (Each unit have one question)**

**Section – B**

**Answer ALL Questions (Either or Type)**

**5x6=30(Either or type Each unit one Question)**

**Section – C**

**Answer any THREE Questions (3 Out of five)**

**3x10=30(3 out of 5 Each unit have each question)**