BACHELOR OF SCIENCE
MATHEMATICS

SYLLABUS: 2017-18 Onwards

Dr. N.G.P ARTS AND SCIENCE COLLEGE (Autonomous)
(Re-Accredited with A Grade by NAAC)
(Affiliated to Bharathiar University,)
Dr. N.G.P. Nagar - Kalapatti Road
Coimbatore-641 048

BACHELOR OF SCIENCE - MATHEMATICS
REGULATIONS

ELIGIBILITY

Candidate for admission to the first year of the **B.Sc. Mathematics** degree course shall be required to have passed the higher secondary examination conducted by the Govt. of Tamil Nadu with Mathematics as one of the subjects are only eligible or other examinations accepted as equivalent there to by the academic council, subject to such other conditions as may be prescribed there for. Business Mathematics, General Mathematics and Statistics subject at HSC cannot be considered as equivalent to Mathematics.

PROGRAMME EDUCATIONAL OBJECTIVES:

- Mathematics is the key to success in the field of science and engineering.
- Today, the students need a thorough knowledge of fundamental basic principles, methods, results and a clear perception of the power of mathematical ideas and tools to use them effectively in modeling, interpreting and solving the real world problems.
- Mathematics plays an important role in the context of globalization of Indian economy, modern technology and we find the applications of Computers in all walks of life from Agriculture to Atomic research.
- This course is aimed at preparing the students to cope with the latest developments and compete with students from other universities and put them on the right track.

SCHEME OF EXAMINATION

Course Code	Course	Hrs of Instruction	Exam Duration (Hrs)	Max Marks			Credit Points
				CA	CE	Total	
First Semester							
Part – I							
17UTL11T/ 17UHL11H/ 17UML11M/ 17UFL11F	Tamil-I/ Hindi-I/ Malayalam-I/ French – I	5	3	25	75	100	3
Part – II							
17UEG12E	English - I	5	3	25	75	100	3
Part – III							
17UMT13A	Core- I: Classical Algebra	5	3	25	75	100	4
17UMT13B	Core - II: Calculus	6	3	25	75	100	4
17UPY1AA	Allied- I: Physics – I	4	3	20	55	75	3
	Allied Practical –I: Physics	3	-	-	-	-	-
Part – IV							
17UFC1FA	Value Education Environmental studies	2	2	-	50	50	2
		30				**525**	**19**
Second Semester							
Part – I							
17UTL21T/ 17UHL21H/ 17UML21M/ 17UFL21F	Tamil-II/ Hindi-II/ Malayalam-II/ French – II	5	3	25	75	100	3
Part – II							
17UEG22E	English - II	5	3	25	75	100	3
Part – III							
17UMT23A	Core -III: Analytical Geometry	5	3	25	75	100	4
17UMT23B	Core- IV: Trigonometry, Vector Calculus and Fourier Series	6	3	25	75	100	4
17UPY2AA	Allied- II: Physics – II	5	3	20	55	75	3
17UPY2AP	Allied	2	3	20	30	50	2

10/11/2018

BoS Chairman/HoD
Department of Mathematics
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Dr. P.R.MUTHUSWAMY
PRINCIPAL
Dr. NGP Arts and Science College
Dr. NGP - Kalapatti Road
Coimbatore - 641 048
Tamilnadu, India

	Practical –I: Physics						
Part – IV							
17UFC2FA	Value Education: Human Rights	2	2	-	50	50	2
		30				**575**	**21**
Third Semester							
Part – I							
17UTL31T/ 17UHL31H/ 17UML31M/ 17UFL31F	Tamil-III/ Hindi-III/ Malayalam-III/ French – III	4	3	25	75	100	3
Part – II							
17UEG32E	English - III	4	3	25	75	100	3
Part – III							
17UMT33A	Core-V : Differential Equations	5	3	25	75	100	4
17UMT33B	Core -VI: Numerical Methods	5	3	25	75	100	3
17UMT3SA	Skill based subject-I : Quantitative Aptitude – I	3	2	-	50	50	3
17UMT3AA	Allied- III: Mathematical Statistics –I	5	3	20	55	75	4
Part – IV							
	NMEC-I	2	2	-	50	50	2
17UFC3FA/ 17UFC3FB/ 17UFC3FC/ 17UFC3FD/ 17UFC3FE	Tamil / Advanced Tamil (OR) Yoga for Human Excellence / Women's Rights / Constitution of India	2	2	-	50	50	2
		30				**625**	**24**
Fourth Semester							
Part – I							
17UTL41T/ 17UHL41H/ 17UML41M/ 17UFL41F	Tamil-IV/ Hindi-IV/ Malayalam-IV/ French – IV	4	3	25	75	100	3
Part – II							

17UEG42E	English - IV	4	3	25	75	100	3
Part – III							
17UMT43A	Core -VII : Mechanics	4	3	25	75	100	4
17UMT43B	Core -VIII: Programming in C	3	2	-	50	50	3
17UMT43P	Core Lab I: Programming in C	4	3	20	30	50	2
17UMT4SA	Skill based subject-II: Quantitative Aptitude – II	3	2	-	50	50	3
17UMT4AA	Allied-IV: Mathematical Statistics –II	4	3	20	55	75	4
Part – IV							
	NMEC-II	2	2	-	50	50	2
17UFC4FA/ 17UFC4FB/ 17UFC4FC	Tamil / Advanced Tamil (OR) General Awareness	2	2	-	50	50	2
		30				**625**	**26**
Fifth Semester							
Part – III							
17UMT53A	Core- IX: Real Analysis-I	6	3	25	75	100	5
17UMT53B	Core -X: Complex Analysis-I	5	3	25	75	100	4
17UMT53C	Core -XI: Abstract Algebra	6	3	25	75	100	4
17UMT53D	Core -XII: Discrete Mathematics	5	3	25	75	100	4
17UMT5SA	Skill Based Subject-III : Operations Research –I	3	2	-	50	50	3
	Elective – I	5	3	25	75	100	4
		30				**550**	**24**
Sixth Semester							
Part – III							
17UMT63A	Core- XIII: Real Analysis-II	6	3	25	75	100	5
17UMT63B	Core -XIV: Complex Analysis-II	5	3	25	75	100	4
17UMT63C	Core -XV: Linear Algebra	6	3	25	75	100	4

17UMT6SA	Skill Based Subject-IV : Operations Research –II	3	2	-	50	50	3
	Elective – II	5	3	25	75	100	4
	Elective – III	5	3	25	75	100	4
Part – V							
17UEX65A	Extension Activity	-	-	50	-	50	2
	Total	**30**				**600**	**26**
					Grand Total	**3500**	**140**

ELECTIVE – I

(Student shall select any one of the following Course as Elective-I in Fifth Semester)

S.No	Course Code	Name of the Course
1	17UMT5EA	Fuzzy Logic
2	17UMT5EB	Astronomy-I
3	17UMT5EC	History of Mathematics I

ELECTIVE - II

(Student shall select any one of the following Course as Elective-II in Sixth Semester)

S.No	Course Code	Name of the Course
1	17UMT6EA	Automata Theory & Formal Languages
2	17UMT6EB	Astronomy-II
3	17UMT6EC	History of Mathematics II

ELECTIVE - III

(Student shall select any one of the following Course as Elective-III in Sixth Semester)

S.No	Course Code	Name of the Course
1	17UMT6ED	Number Theory
2	17UMT6EE	Special Functions and Integral Transforms
3	17UMT6EF	Graph Theory

NON MAJOR ELECTIVE COURSES

- The Department offers the following two papers as Non Major Elective Courses for other than the mathematics related students.

- Student shall select any one of the following Course as Non Major Elective Courses during their III and IV semester

S.No	Semester	Course Code	Name of the Course
1	III	17UNM34Y	Aptitude-I
2	IV	17UNM44Y	Aptitude-II

FOR PROGRAMME COMPLETION

Students have to complete the following Courses:

- Language papers (Tamil/Malayalam/French/Hindi, English) in I and II semester.
- Core courses in I To VI Semester
- Environmental Studies in I semester.
- Value Education in II and III semester respectively.
- General Awareness in IV semester.
- Allied papers in I, II, III and IV semesters.
- Skill Based Courses in III,IV,V and VI semesters
- Non Major Elective Courses in III and IV semester.
- Elective papers in the fifth and sixth semesters.
- Extension activity in VI semester.

Earning Extra credits is not mandatory for Programme completion

Extra credits

Course	Papers	Credit	Total credits
BEC/ Self study courses	1 papers	1	**1**
Hindi / French/ Other foreign Language approved by certified Institutions	1 Course	1	**1**
Type Writing / Short Hand Course	1 Course	1	**1**
Diploma/certificate/CPT/ACS Inter/ NPTEL Course	1 Course	1	**1**
Representation – Academic/Sports /Social Activities/ Extra Curricular / Co-Curricular activities at University/ District/ State/ National / International level or Participation in government agencies sponsored workshop (minimum 3 days)	1	1	**1**
Total	4		**5**

Rules:

The students can earn extra credit only if they complete the above during the course period (I to V sem) and based on the following criteria. Proof of Completion must be submitted in the beginning of VI Semester. (Earning Extra credits is not mandatory for Course completion)

1. Student can opt BEC course/ Self study course to earn one credit. They have to Enroll and complete any one of the course during their course period before fifth semester (I semester to V semester).

Self study paper offered by the Mathematics Department

S. No.	Semester	Course Code	Course Title
1.	Semester III	17UMTSS1	VEDIC MATHEMATICS I
2.		17UMTSS2	VEDIC MATHEMATICS II

2. Student can opt Hindi/ French/ Other foreign Language approved by certified Institutions to earn one credit. The certificate(Hindi) must be obtained from **Dakshina Bharat Hindi Prachar Sabha** and He/ she has to enroll and complete during their course period (Third Semester)
3. Student can opt for Type writing /short hand course to earn one credit extra. He/she has to enroll and complete the course during their course period to obtain certificate through **Tamil Nadu Board of Technical Education**
4. Student can opt for Diploma/certificate/CPT/ACS Inter/ NPTEL Course to earn one credit extra. Student who opt for Diploma/ Certificate course have to enroll any diploma/certificate course offered by Bharathiar University through our Institution. Student who opt for CPT/ ACS/CMA have to enroll and complete at foundation level during the course period. The course content of which shall be equivalent to that prescribed by ICAI/ICMA/ICSI. Students who opt for NPTEL course should complete certificate through NPTEL.
5. Award Winners in Academic/ Representation in Sports /Social Activities/ Extra Curricular/ Co-Curricular Activities at University/ District/ State/ National/ International level can earn one credit extra.
6. The students who participate in workshops with a minimum duration of 3 days, sponsored by any government agency, are eligible for getting one extra credit.

Total Credit Distribution

Courses	**Total Papers**	Marks Per Paper	Credit Per	Total Marks	**Total Credits**	**Cumulative Total**
Part I: Tamil	4	100	3	400	12	24
Part II: English	4	100	3	400	12	
Part III:						
Core	2	100	5	200	10	102
Core	11	100	4	1200	44	
Core	1	100	3	100	3	
Core	1	50	3	50	3	
Core Lab	1	50	2	50	2	
Allied Theory	2	75	4	225	08	
Allied Theory	2	75	3	75	06	
Allied Practical	1	50	2	50	2	
Skill Based	4	50	3	200	12	
Elective	3	100	4	300	12	
Part IV:						
NMEC	2	50	2	100	04	12
Foundation	2	50	2	100	04	
Value Education	1	50	2	50	02	
Environmental	1	50	2	50	02	
Part V:						
Extension Activity			2	50	02	02
Total				**3500**	**140**	**140**

PROGRAMME OUTCOMES

PO No	PO Statement
PO 1	The learner will have a sound knowledge of the concept underlying standard applications of Mathematics, Physics and Statistics
PO 2	The learner will have an understanding on basic pure and applied Mathematics and able to formulate the Mathematical arguments in logical manner
PO 3	They can be able to communicate Mathematical concepts effectively by oral, written, computing and graphical means
PO 4	The learner will have a systematic understanding of the theories of Mathematics and their applications in real world problems
PO 5	The learners can able to analyze the complex physical problems and apply the mathematical techniques to solve them

17UMT13A	CORE –I: CLASSICAL ALGEBRA	SEMESTER - I

PREAMBLE:

1. On successful completion of this course the students should gain knowledge about the convergence of series.
2. Solving equations by various methods.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about sequences and series in particular Binomial, Exponential and Logarithmic	K1
CO 2	Determine the Convergence or Divergence of sequences and series	K1
CO 3	Apply Convergence test to infinite series	K2
CO 4	Apply Binomial Theorem to the summation of series	K2
CO 5	Solve the problems related to theory of equations.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	M
CO 2	S	S	S	S	M
CO 3	S	M	S	S	S
CO 4	S	S	M	S	S
CO 5	S	S	S	S	S

S- Strong; M-Medium ; L-Low

17UMT13A	CORE –I: CLASSICAL ALGEBRA	SEMESTER - I

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

BINOMIAL THEOREM: Binomial Theorem-The greatest Coefficient in the expansion of $(1+x)^n$-The greatest term in the expansion of $(1+x)^n$-Summation of various series involving Binomial coefficients-MULTINOMIAL THEOERM: Expansion of the product $(a+b+c+d+\cdots)^n$-Vandermonde's Theorem-Binomial Theorem for a rational index-Some important particular cases of the Binomial expansion-Sign of terms in the Binomial expansion-Numerically greatest term-Application of the Binomial Theorem to the summation of series.

UNIT - II

EXPONENTIAL AND LOGARITHMIC SERIES: The exponential theorem-Summation-The logarithmic series (Theorem)-Modification of the logarithmic series-Euler's constant-series which can be summed up by the logarithmic series.

UNIT - III

CONVERGENCY AND DIVERGENCY OF SERIES: Some general theorems concerning infinite series-series of positive terms-Comparison tests-Cauchy's condensation test-D'Alembert's Ratio Test.

UNIT-IV

CONVERGENCY AND DIVERGENCY OF SERIES: Cauchy's root test-Rabbe's test-Absolutely convergent series- Absolutely convergent series is convergent-Conditionally convergent series.

UNIT-V

THEORY OF EQUATIONS: Reminder theorem- Equation with real coefficients imaginary root's occur in pairs- Equation with rational coefficients irrational roots occur in pairs-Relation between the roots and coefficients of equations-Transformations of equations-Reciprocal equation-To increase (or) decrease the roots of a given equation by a given quantity-Form of the quotient and reminder when a polynomial is divided by a binomial-Removal of terms.

TEXT BOOK:

1. *Manicavachagom Pillai, T.K. Natarajan,T. and Ganapathy,K.S*. 2015. **Algebra. Vol 2** Viswanathan Printers & Publishers Private Ltd.

   Unit I : (Chapter 3 : Sec 1,2,4,5,6,7,8,10)

   Unit II: (Chapter 4 : Sec 2,3,5,6,7,8,9)

   Unit III: (Chapter 2 : Sec 11,12,13,14,15,16)

   Unit IV: (Chapter 2: Sec 17,18,19,21,22,23,24)

   Unit V : (Chapter 6 :Sec 1-11,15,16,17,18,19)

REFERENCE BOOKS:

1. *Kandasamy,P and Thilagavathy, K.* 2004. **Mathematics Branch I – Volume 1.** S.Chand and Company Ltd. New Delhi.
2. *Bali, N.P*. 2010-11.**Algebra.** Laxmi publications B.Sc. Mathematics (Colleges)

17UMT13B	CORE –II: CALCULUS	SEMESTER - I

PREAMBLE:

1. On successful completion of this course the students should have gain the knowledge about the evolutes and envelopes
2. To know about the different types of integrations, and its geometrical applications.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about Partial and total derivatives.	K1
CO 2	Finding Evolute and involute.	K2
CO 3	Apply integration to rational and irrational functions.	K2
CO 4	Solving double and Triple integrals	K3
CO 5	Learn Beta , Gamma integrals and its applications.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	M	S	S	S	S
CO 2	M	S	S	M	S
CO 3	S	S	M	S	S
CO 4	S	M	S	S	S
CO 5	S	S	S	M	S

S- Strong; M-Medium ; L-Low

17UMT13B	CORE –II: CALCULUS	SEMESTER - I

Total Credits:4
Hours Per Week:6

CONTENTS

UNIT - I

Partial Differentiation: Partial derivatives – Function of function rule – Total differential coefficient- Special case – Implicit functions – Homogeneous functions – Partial derivatives of a function of two functions.

UNIT - II

Curvature: Envelopes-Methods of finding envelopes - Circle, Radius and Center of curvature – Cartesian formula for the radius of curvature - The co-ordinates of the center of curvature – Evolute and involute – Radius of curvature in polar co-ordinates – Pedal equation of a curve .

UNIT – III

Integration: Integration of rational algebraic functions – Special cases – Integration of irrational functions – Properties of definite integrals - Integration by parts

UNIT –IV

Multiple integrals: Evaluation of the double integral – Double integral in polar co-ordinates- Triple integral- Applications of multiple integrals.

UNIT – V

Beta and Gamma functions: Definitions - Recurrence formula for Gamma functions – Properties of Beta functions – Relation between Beta

and Gamma functions – Applications of Gamma functions to multiple integrals.

TEXT BOOKS:

1. *Narayanan,S and Manicavachagom Pillai, T.K* .2015. **Calculus volume I.** S.Viswanathan Publishers,Chennai.
    a. Unit -I : (Chapter VIII : Sec-1.1 to 1.7)
    b. Unit -II : (Chapter X : Sec- 1.1-1.4 and 2.1-2.8)
2. *Narayana.S and Manicavachagom Pillai, T.K* . 2009. **Calculus volume II.** S.Viswanathan Publishers,Chennai.

    Unit -III : (Chapter 1: 7,8,11,12),

    Unit -IV : (Chapter 5 : 2.1,2.2,3.1,4,5.1)

    Unit -V : (Chapter 7: 2.1, 2.2,2.3,3,4,5,6)

REFERENCE BOOKS:

1. *Kandasamy,P and Thilagavathy,K.* 2004. **Mathematics for BSc – Volume I and II.** S.Chand and Company.
2. *Shanthi Narayanan and Kapoor,J.N*. 2003. **A Text book of Calculus.** S.Chand & Co.

17UPY1AA	ALLIED- I: PHYSICS-I	SEMESTER – I

PREAMBLE:

1. To enable students to learn and apply the basic principles, theory and concepts of Mechanics, Heat and Sound.

COURSE OUTCOMES:

On the successful completion of the programme, students will able to demonstrate

CO Number	CO Statement	Knowledge Level
CO1	Basic understanding of Gravitation and Elasticity and principles underlining them.	K2
CO2	Applications of Heat, Thermodynamics and Acoustics.	K3
CO3	Understanding of Solar energy and its industrial applications.	K2
CO4	Comparing and understanding principles involved in Electricity and Magnetism.	K2
CO5	Applications of Nano and Smart materials.	K3

Mapping with Programme Outcomes

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	M	S	S	M	S
CO3	S	S	S	M	M
CO4	S	S	S	S	S
CO5	M	S	S	M	S

S-Strong; M-Medium; L-Low

17UPY1AA	ALLIED- I: PHYSICS-I	SEMESTER – I

Total Credits: 3
Hours Per Week: 4

CONTENTS

UNIT - I

Gravitation: Newton's law of Gravitation-Determination of G by Boy's method-mass and density of earth – acceleration due to gravity-Determination of g by compound pendulum.

Elasticity: Basic concepts – bending of beams – depression of cantilever-Determination of Y by uniform and non- uniform bending method-Torsion in a wire- Determination of rigidity modulus by torsional pendulum.

UNIT - II

Heat and thermodynamics : Vanderwaal's equation of state-critical constants of a gas-derivation of critical constants in terms of Vanderwaal's contants – Joule – Thomson – effect – Theory of J-K effect – properties of liquid Helium I and II.

Sound: Doppler effect – applications – determination of frequency of alternating current by Sonometer – Ultrasonics – production, properties and applications

UNIT - III

Solar Physics: Solar constant – measurement of solar radiations by Pyroheliometer and Pyranometer – general applications of solar energy – flat–plate collector – box type cooker - solar water heaters – solar photo – voltaic cells – general applications of solar cells.

UNIT - IV

Electricity: Conversion of Galvanometer into Ammeter and voltmeter – figure of merit of a galvanometer – Ballistic Galvanometer.

Magnetism: Basic concepts of magnetic materials – magnetic properties of Dia, Para and Ferro magnetic materials – Area of (B-H) loop – Curie temperature – applications of magnetic materials.

UNIT - V

Nano materials: Introduction-Nano technology-preparation techniques-properties of Nano materials- Application of Nano materials.

Smart materials: Metallic glasses - Shapememory alloys-Biomaterials-Non-Linear optical materials-Applications.

TEXT BOOKS:

1. *Brij Lal and Subrahmanyam N.* 2003. **Properties of Matter**, S. Chand and Co, New Delhi.
2. *G. D. Rai* Fourth Edition reprint 2003. **Non -Conventional energy Sources** - Khanna Publication.
3. *Brijlal and Subrahmanyam 2004.* **Heat and Thermodynamics**, S.Chand & Co., New Delhi
4. *N. Subramanian and Brijlal N (2005).* ***A Text Book of Sound***, S. Chand & Co,New Delhi
5. Brijlal and Subramanian (2005).**Electricity and Magnetism**, S. Chand &Co.,
6. *R. Murugesan* (2005). **Electricity and Magnetism**, S. Chand & Co.,
7. *Dieter Vollath*, **Nanomaterials: An Introduction to Synthesis, Properties and Applications**, 2nd Edition

REFERENCE BOOKS:

1. *R. Murugesan* (2005). **Properties of matter**s, Chand & Co.,
2. *Sukhatme (*2008). ***Solar Energy*** **Utilization**, Tata McGraw-Hill Education.
3. *D. S. Mathur* (2004). **Heat and Thermodynamics**, Chand & Co, Newdelhi.
4. *R. L. Saighal (2005*). **A Text Book of Sound**, S. Chand & Co.,
5. *D. N. Vasudeva* (2005). **Electricity and Magnetism**- S. Chand & Co.,
6. *S.Muthukumaran, Balaji (2014).***Engineering Physics -II**, Sri Krishna hi-tech Publishing company.

17UMT23A	CORE –III: ANALYTICAL GEOMETRY	SEMESTER – II

PREAMBLE:

1. This course gives emphasis to enhance students' knowledge in two dimensional and three dimensional analytical geometry.
2. Conic sections in polar coordinates and the geometrical aspects of three dimensional figs, viz, sphere, cone and cylinder.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about plane and its properties.	K1
CO 2	Understand the concept of Straight lines and plane-coplanar lines.	K2
CO 3	Learn about Sphere and its properties.	K2
CO 4	Apply the concept of line and plane in cone.	K2
CO 5	Solve the problems related to cylinder and its applications.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	S	S	S
CO 2	S	S	M	S	S
CO 3	S	M	S	S	S
CO 4	M	S	S	S	S
CO 5	S	M	M	S	S

S- Strong; M-Medium ; L-Low

17UMT23A	CORE –III: ANALYTICAL GEOMETRY	SEMESTER – II

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT – I

The plane: General equations of a plane – several forms for the equations of a plane- The equation of the plane passing through the points – direction cosines – angle between the planes – intersection of two plane – Length of Perpendicular.

UNIT –II

The straight lines: Symmetrical form- Straight line passing through two points – The plane and the straight line- Angle between the plane-coplanar lines- The shortest distance between two lines.

UNIT –III

The sphere: The standard equation of a sphere – The plane section of a sphere is a circle – Equation of a circle on a sphere – Intersection of two sphere is a circle – The equation of the tangent plane to the sphere

UNIT - IV

Cone : Equation of surface-Right circular cone – Intersection of a straight line and a quadric cone- Tangent plane and normal – Condition for the plane to touch the quadric cone – The angle between the lines in which the plane cuts the cone-Condition that the cone has three mutually perpendicular generators.

UNIT – V

Cylinder : Cylinder – Enveloping cylinder – Central quadrics – The intersection of a line and a quadric – Tangents and tangent planes- The condition for the plane to touch the Conicoid – Polar Planes and polar line.

TEXT BOOK:

1. *Manicavachagom Pillay T.K. and Natarajan T*. 2011. **Analytical Geometry (Three Dimensions)** . S.Viswanathan Publishers .

   Unit I :(Chapter –II:1,2,3,4,5,6,7,8,9,10)

   Unit II : (Chapter – III -1,2,3,4,5,6,7,8)

   Unit III :(Chapter –IV:1,2,3,4,5,6,7,8)

   Unit IV :(Chapter -V:1,2,3,4,5,6)

   Unit V : (Chapter –V – 8,9,10,11,12,13)

REFERENCE BOOK:

1. *Durai Pandian, P. Laxmi duraipandian and Mukilan, D*. 2003. **Analytical Geometry 3D.** S. Chand and Company.

17UMT23B	CORE –IV: TRIGNOMETRY , VECTOR CALCULUS AND FOURIER SERIES	SEMESTER – II

PREAMBLE:

1. On successful completion of this course the students should have gained knowledge about expansion of trigonometric functions.
2. To know about the concept of line integral, surface integral, volume integral and Fourier series.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about expansion of Trigonometric functions and hyperbolic functions.	K1
CO 2	Expand complex quantity.	K2
CO 3	Learn the concept of Vectors and its properties.	K2
CO 4	Apply the properties of Vector in Green's and Stoke's theorem	K2
CO 5	Solve the real life problems in Fourier series	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	S	S	S
CO 2	S	S	M	S	S
CO 3	S	S	S	S	S
CO 4	S	S	S	S	M
CO 5	S	M	S	M	S

S- Strong; M-Medium ;L-Low

17UMT23B	CORE –IV: TRIGNOMETRY , VECTOR CALCULUS AND FOURIER SERIES	SEMESTER – II

Total Credits:4
Hours Per Week:6

CONTENTS

UNIT - I

Expansion: Expansion of $cosn\theta$ and $sinn\theta$ - powers of sines and cosines of θ in terms of functions of multiples of θ – Expansion of $cos^n\theta$ and $sin^n\theta$ - Expansion of sinθ and cosθ- Hyperbolic functions – Inverse hyperbolic functions.

UNIT - II

Logarithmic of complex quantities : Definition – General value of log(x+iy)- Simple problems – Summations of trigonometric series- Method of differences- sum of the series of n angles in A.P- sum of cosines of n angles in A.P- summation of series by using complex quantities

UNIT – III

Differentiation of vectors: Definition of vectors – Some standard results – Gradient – Divergence- Curl – Solenoidal - Irrotational- Problems only.

UNIT –IV

Integration of vectors: Line integral – Surface and volume integrals – Gauss divergence theorem – Green's theorem- Stoke's theorem- simple problems

UNIT – V

Fourier series: Definition- Finding Fourier coefficients for a given periodic function with period 2π- Odd and even functions – Half range series.

TEXT BOOKS:

1. *Narayanan,s and Manicavachagom pillay, T.K.* 2015. **Trigonometry**. S.Vishwanathan publishers

   Unit I : (Chapter 3:1,4,4.1,5) and (Chapter 4: 1,2,2.1,2.2,2.3)

   Unit II : (Chapter 5: 5,5.1,5.2) and (Chapter 6: 1,2,3)
2. *Vittal,P.R and Malini,.V*. 2014. **Vector Analysis**. Margham publications

   Unit III : (Chapter 1)

   Unit IV : (Chapter 2)
3. *Narayanan,s and Manicavachagom pillay, T.K.*2009. **Fourier series** .S.Vishwanathan publishers .

   Unit V : (Chapter 1: 1,2,3,4,5.1,5.2)

REFERENCE BOOKS:

1. *Kandasamy,P. and Thilagavathi , K. 2003.* ***Mathematics*** **Volume IV** (Vector Calculus, Fourier Series) S.Chand & Company Ltd., Ramnagar, New Delhi. (Unit-I&II).
2. *Durai Pandian, P. Laxmi duraipandian and Mukilan,D*. 2003 **Vector Calculus.** S.Chand & Company Ltd., Ramnagar, New Delhi. (Unit-III &IV).
3. *Narayanan,S and Manicavachagom pillay ,T.K.*2009. **Fourier Series –** S.Viswanathan Publishers. (Unit-IV)

17UPY2AA	ALLIED –II: PHYSICS- II	SEMESTER – II

PREAMBLE:

1. To enable the students in order to learn the basic principles, theory and concepts of Nuclear Physics and Wave Mechanics.
2. To acquire introductory knowledge in the field of Semiconductor and Laser Physics.

COURSE OUTCOMES:

On the successful completion of the programme, students will able to demonstrate

CO Number	CO Statement	Knowledge Level
CO1	Basic understanding of Photo electric effect and Wave Mechanics.	K2
CO2	Applications of Accelerators and understanding Elementary Physics.	K3
CO3	Understanding of basics of Laser Physics and Spectroscopy.	K2
CO4	Understanding Semiconductor Physics and their applications.	K2
CO5	Applications of Integrated Circuits and Digital Electronics.	K3

Mapping with Programme Outcomes

COs / POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	M	S
CO2	M	S	S	M	S
CO3	S	S	S	M	M
CO4	S	S	S	S	S
CO5	M	S	S	M	S

S-Strong; M-Medium; L-Low

17UPY2AA	ALLIED –II: PHYSICS- II	SEMESTER – II

Total Credits: 3
Hours Per Week: 5

CONTENTS

UNIT - I

Modern physics: Photo electric effect – Einstein's photo electric equation – verification of Einstein's photo electric equation by Millikan's experiment – photo electric cells – applications

Wave mechanics: De Broglie matter waves – calculation of De Broglie wave length – Experimental study of De Broglie matter wave by G.P.Thomson experiment.

UNIT - II

Nuclear physics : characteristics of nuclear forces – nuclear structure by liquid drop model – Binding energy – mass defect – particle accelerators – cyclotron and betatron – artificial transmutations by α – particles - nuclear Fission and nuclear Fusion (basic idea only) – elementary particles – Leptons, Mesons and Baryons

UNIT - III

Laser physics: Purity of spectral lines – Coherence length and time – spontaneous and induced emissions – population inversion – meta stable state – conditions for laser actions – Ruby laser – Helium – neon laser – applications of lasers – Raman effect – Raman shift – stokes and anti stokes lines – Laser Raman Spectrometer.

UNIT – IV

Semiconductor Physics: Volt – Ampere Characteristics of P-N junction Diode – Zener diode – applications of Zener diodes - Volt – Principles of

LED and LCD – Frequency Modulation and Amplitude modulation – basic principles of antennas – RADAR – Principle and applications.

UNIT - V

Integrated Circuits and Digital Electronics: Introduction - Steps in fabrication of Monolithic IC's – General applications of IC's.

Digital Electronics: Number systems – conversion of binary into decimal – conversion of decimal to binary – binary addition and subtraction – Basic logic gates – NAND and NOR as an universal logic gates – Demorgan's theorems – Boolean algebra –applications of Demorgan's theorems.

TEXT BOOKS:

1. *R. Murugesan* (2004)**, Modern Physics ,**S. Chand & Co.
2. *M.N.Aravamudhan*, **An Introduction to Laser Theory and application**, S.Chand *& Co.*
3. *B.L. Theraja* (2000).**Basic Electronics (Solid state)**, S. Chand & Co.
4. *Malvino & Leach,* **Digital Principles and application**, Tata-McGraw Hill Publishers.
5. *V.K. Metha* , **Principles of Electronics** , S. Chand & Co.

REFERENCE BOOKS:

1. *Gupta and Kumar* ,**Handbook of Electronics**, S. Chand & Co.
2. *R.K. Gaur* (1993), **Engineering Physics,** Dhanpat Rai & Sons.
3. *Arumugam M*(2010). ***Engineering Physics***, Anuradha *publishers.*
4. *Bartee* (1985), **Digital Computer Fundamentals,** McGraw-Hill Education (India) Pvt Limited.

17UPY2AP	ALLIED PRACTICAL - PHYSICS	SEMESTER-II

Total Credits: 2
Hours per Week:2

LIST OF EXPERIMENTS:

Any 12 Experiments

1. Young's Modulus-Uniform Bending (Microscopic Method)
2. Young's Modulus-Non-uniform Bending (Microscopic Method)
3. Compound Pendulum – determination of 'g' and 'K'
4. Torsional Pendulum – Rigidity Modulus
5. Rigidity Modulus – Static Torsion
6. Spectrometer – Refractive Index of a glass Prism
7. Spectrometer – Grating- Minimum deviation & Normal Incidence
8. Moment of a Magnet – Tan C position
9. Viscosity – Poiseuille's Method
10. Meter Bridge- Temperature Coefficient of resistance
11. Meter Bridge- Specific Resistance of a material
12. Specific Heat capacity of a Liquid – Newton's method of cooling
13. Sonometer – Frequency of a tuning fork
14. Post office box- Determination of Temperature Coefficient of Resistance
15. Post office box- Determination of Specific Resistance

17UMT33A	CORE –V: DIFFERENTIAL EQUATIONS	SEMESTER – III

PREAMBLE:

1. End of this course, the students should gain the knowledge about the method of solving Differential Equations.
2. It also exposes Differential Equation as a powerful tool in solving problems in Physical and Social sciences.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about Formation of differential equations	K1
CO 2	Learn about Growth, Decay and Chemical Reactions	K2
CO 3	Learn the linear equations with constant coefficients	K2
CO 4	Learn about Applications to the vibrations	K2
CO 5	Solve the Simultaneous linear differential equations	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	M	S	S
CO 2	S	M	S	S	S
CO 3	S	S	S	S	S
CO 4	S	S	S	S	M
CO 5	S	M	S	M	S

S- Strong; M-Medium ;L-Low

17UMT33A	CORE –V: DIFFERENTIAL EQUATIONS	SEMESTER – III

Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Introduction: Definitions- Solution of differential equations- Formation of differential equations - Equations of the First Order and of the First Degree : Variables Separable – Homogeneous equations - Non homogeneous equations – Linear Equation – Bernouilli's equation – Exact differential equations.

UNIT - II

Application of First Order Equations: Growth, Decay and Chemical Reactions – Falling bodies and other rate problems – The Brachistochrone – Fermat and Bernouilli – Simple electric circuits – Dynamical problems with variable mass.

UNIT - III

Linear equations with constant coefficients: Definitions – The operator D – Complementary function of a linear equation with constant coefficients – particular integral.

UNIT - IV

Linear equations with constant coefficients – Linear equations with variable coefficients – Equations reducible to the linear equations – Applications to the vibrations in mechanical systems.

UNIT - V

Simultaneous Differential Equations: Simultaneous equations of the first order and first degree – Solutions of $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ – Methods for solving $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ - Geometrical interpretation of $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$ - Simultaneous linear differential equations – Simultaneous equations with variable coefficients.

TEXT BOOK:

1. *Narayanan.S and Manicavachagom pillay .T.K.* 2014. **Differential Equations and its Applications**. S. Viswanathan Pvt. Ltd. Chennai.

Unit - I : Chapter 1 (Sections 1,2,3)
Chapter 2 (Sections 1,2,3,4,5,6)
Unit - II : Chapter 3 (Sections 1,3,4,5,6,7)
Unit - III : Chapter 5 (Sections 1,2,3,4)
Unit - IV : Chapter 5 (Sections 5,6,7)
Unit - V : Chapter 6 (Sections 1,2,3,4,5,6,7)

REFERENCE BOOKS:

1. *Ahsan Zafar*. 2016.**Differential Equations and their Applications(**3rd Revised edition)**.** PHI learning (P) Ltd. New Delhi.
2. *James R. Brannan,William E. Boyce*.2015. **Differential Equations: An Introduction to Modern Methods and Applications**.Wiley.
3. ***Bali. N.P.* 2004. Differential Equations. Laxmi Publication Ltd, New Delhi.**

17UMT33B	CORE –VI: NUMERICAL METHODS	SEMESTER – III

PREAMBLE:

1. End of this course, the students should gain the knowledge about the method of solving Differential Equations.
2. It also exposes Differential Equation as a powerful tool in solving problems in Physical and Social sciences.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Find numerical solution of Algebraic and Transcedental Equation.	K1
CO 2	Find errors in polynomial interpolation & Detection of errors by Difference Table.	K2
CO 3	Know the concept of numeric Differentiation and Integration.	K3
CO 4	Know the matrix inversion by Gauss Elimination Method.	K3
CO 5	Solve Ordinary Differential Equation.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	S	S	S
CO 2	S	S	S	S	S
CO 3	S	S	S	S	S
CO 4	S	S	S	M	M
CO 5	S	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT33B	CORE –VI: NUMERICAL METHODS	SEMESTER – III

Credits: 3
Hours Per Week: 5

CONTENTS

UNIT - I

Solution of Algebraic and Transcendental Equations: Introduction - The Bisection method - The Iteration method - The Method of False Position - Newton-Raphson method - Ramanujan's method - Graeffe's Root Squaring method.

UNIT - II

Interpolation: Introduction - Errors in Polynomial Interpolation - Finite Differences - Detection of Errors by Difference Tables - Differences of Polynomial - Newton's Formulae - Gauss's Central Difference Formulae - Stirling's Formula - Interpolation with unevenly spaced point's - Lagrange's interpolation formula - Error in Lagrange's Interpolaton Formula - Hermite Interpolation Formula.

UNIT - III

Numerical Differentiation and Integration: Introduction - Numerical Differentiation - Maximum and minimum values of a Tabulated Function - Numerical Integeration - Trapezoidal Rule - Simpson's 1/3 Rule - Simposon's 3/8 Rule - Bode's and Weddle's Rule - Use of cubic Splines - Romberg Integration.

UNIT - IV

Solution of Linear Systems: Matrix Inversion method - Gaussian Elimination method- Modification of Gauss Method to Compute the

Inverse - Method of Factorizazion - Solution of Tridiagonal systems - Solution of Linear Systems: Iterative methods - Householder's method.

UNIT - V

Numerical Solution of Ordinary Differential Equations: Introduction - Solution by Taylor's series - Picard's Method - Euler's Method - Runge-Kutta Methods - Predictor Corrector Methods.

TEXT BOOK:

1. *S.S. Sastry*, **"Introductory methods of Numerical Analysis",** Third Edition, 1999, Printice-Hall of Undia, New Delhi.

   Unit - I : Chapter 2: Sections 2.1-2.6, 2.8

   Unit - II : Chapter 3: Sections 3.1-3.6, 3.7(3.7.1 and 3.7.2 only),

   3.9(3.9.1 and 3.9.2 only), 3.11(3.11.1 only)

   Unit - III : Chapter 5: Sections 5.1-5.4 (Except 5.4.7)

   Unit - IV: Chapter 6: Sections 6.3, 6.4 and 6.5(6.5.1 only)

   Unit - V : Chapter 7: Sections 7.1-7.6

REFERENCE BOOKS:

1. *M.K. Venkataraman,* **"Numerical Methods in Science and Engineering"**, Fifth Edition, 1999, National Publishing Company.
2. *B.S. Grewal,* **"Numerical Methods in Engineering & Science: with Programs in C and C++",** Tenth Edition, 2010, Khanna Publishers.

17UMT3SA	SKILL BASED SUBJECT –I: QUANTITATIVE APTITUDE I	SEMESTER-III

PREAMBLE:

1. On successful completion of this course the students should gain knowledge about the aptitude.
2. Solving questions by various methods.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about the various numbers and to find the highest common factor and lowest common multiple	K1
CO 2	Determine the squaring and cubing of roots	K1
CO 3	Determine the ages of different persons by using shortcuts	K2
CO 4	Determine the profit and loss	K2
CO 5	Solve the questions by using the given time.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	M
CO 2	S	S	S	S	M
CO 3	S	M	S	S	S
CO 4	S	S	M	S	S
CO 5	S	S	S	S	S

S- Strong; M-Medium ;L-Low

17UMT3SA	SKILL BASED SUBJECT –I: QUANTITATIVE APTITUDE I	SEMESTER – III

Credits: 3
Hours Per Week: 3

CONTENTS

UNIT - I

Numbers- H.C.F. & L.C.M. of Numbers - Decimal Fractions

UNIT - II

Simplification - Square Roots & Cube Roots - Average

UNIT - III

Problems on Numbers - Problems on Ages - Surds & Indices

UNIT - IV

Percentage - Profit & Loss - Ratio & Proportion

UNIT - V

Partnership - Chain Rule - Time & work

TEXT BOOKS:

1. *Agarwal, R.S.* 2015. **Quantitative Aptitude.** Revised Edition. S.Chand and Company Ltd, Ram Nagar, New Delhi -55.
2. Praveen R.V.2013.**Quantitative Aptitude and Logical reasoning.PHI Learning (P) Ltd. Delhi**

REFERENCE BOOK:

1. .*Abhijit Guha*. 2004.**Quantitative Techniques**. S.Chand and Company Ltd, Ram Nagar, New Delhi -55.

17UMT3AA	ALLIED-III: MATHEMATICAL STATISTICS -I	SEMESTER- III

PREAMBLE:

1. On successful completion of this course the students should understood the Concepts of Probability and Random Variable.
2. To know about the concepts of Correlation and Regression.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about Basic concepts of probability theory.	**K1**
CO 2	Learn the concept of random variables and two dimensional random variables	**K1**
CO 3	Apply the Mathematical expectation concept to solve problems.	**K2**
CO 4	Apply the concept of Correlation and Regression Analysis	**K2**
CO 5	Solve the problems related to Correlation and Regression Analysis	**K3**

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	S	S	S
CO 2	S	S	S	S	S
CO 3	S	S	S	S	S
CO 4	S	S	S	M	M
CO 5	S	S	S	S	S

S- Strong; M-Medium ;L-Low

17UMT3AA	ALLIED-III: MATHEMATICAL STATISTICS -I	SEMESTER- III

Credits: 4
Hours Per Week:5

CONTENTS

UNIT – I

Probability : Basic terminology- Mathematical Probability- Statistical probability- Subjective Probability- Mathematical Tools- Some theorems on probability- Addition and Multiplication theorems on probability- Conditional probability-Independent events.

UNIT – II

Random variables:Introduction-Discrete and Continuous random variables- Distribution function-properties- Probability mass function, Probability density functions- Two Dimensional random Variable-Joint probability Mass function-Two dimensional distribution function- Joint probability distributions-marginal and conditional probability distributions-Independence of random variables.

UNIT – III

Mathematical Expectation: Introduction- Expected value of a random variable- Expected function a random variable-Properties of Expectation-Properties of Variance-Covariance- Addition and Multiplication theorems on expectations. Moments of Bivariate probability distributions-Conditional expectation and Conditional variance.

UNIT – IV

Moment Generating Functions: Cumulants –Properties of Cumulants-Characteristic Functions and their properties. – Some important theorems: Uniqueness theorems of Characteristic function-Hall-Bray theorem- Necessary and sufficient condition for independence of random variables in terms of characteristic function-Chebychev's Inequality-Weak law of large numbers.

UNIT –V

Curve Fitting and Principle of Least Squares: Fitting of curves of Straight line Second degree Parabola, Power curve and Exponential curves- Correlation and Regression Analysis.

TEXT BOOK:

1.*Gupta, S.C and V.K.Kapoor*.2007. **Fundamentals of Mathematical Statistics**, S. **C**hand and Co New Delhi.

UNIT - I : Chapter 3: 3.1 – 3.7, 3.9, 3.10 & 3.11

UNIT - II : Chapter 5: 5.1-5.5(5.5.1 -5.5.5)

UNIT - III : Chapter 6 : 6.1 – 6.6, 6.8 & 6.9

UNIT - IV : Chapter 7 : 7.1-7.2, 7.3(7.3.1-7.3.2),7.4
(Theorem 7.2,7.3,7.4), 7.5 & 7.7

UNIT - V : Chapter 10 : 10.1-10.4, 10.7
Chapter 11: 11.1-11.2(11.2.1-11.2.3) &11.3

REFERENCE BOOKS:

1. *Gupta, C.B and Vijay Gupta*.2007. **Introduction to Statistical Methods**. S.Chand & Co, New Delhi.
2. *Sanchetti, D.C. Kapoor, V.K*.2010. **Statistics**, S.Chand & Co, New Delhi.
3. Veerarajan, T. 2017, **Fundamentals of Mathematical Statistics**, Yes Dee Publishing Pvt Ltd, Chennai.

17UNM34Y	NMEC–I :APTITUDE - I	SEMESTER – III

Credits: 2
Hours Per Week:2

PREAMBLE:

1. To enable students gain fundamental knowledge about the Mathematical skills
2. To explain the extent of the application of analytical skills.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about the various numbers and to find the highest common factor and lowest common multiple	K1
CO 2	Learn about Probability	K1
CO 3	Determine the ages of different persons by using shortcuts	K2
CO 4	Determine the Ordering	K2
CO 5	Solve the questions by using diagrams.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	M
CO 2	S	S	S	S	M
CO 3	S	M	S	S	S
CO 4	S	S	M	S	S
CO 5	S	S	S	S	S

S- Strong; M-Medium ; L-Low

17UNM34Y	NMEC–I :APTITUDE - I	SEMESTER – III

Credits: 2
Hours Per Week:2

CONTENTS

UNIT - I

Numbers – Average – Problems on numbers.

UNIT - II

Clocks – Probability – Heights and Distances.

UNIT - III

Odd man out and Series – Allegation or Mixture – Problems on ages.

UNIT - IV

Coding and decoding – cubes and dices – Ranking and Ordering.

UNIT - V

Puzzles – Diagram related problems.

TEXT BOOKS:

1. *Agarwal, R.S.* 2015. **Quantitative Aptitude.** Revised Edition. S. Chand and Company Ltd, New Delhi.
2. *Praveen, R.V.* 2013. **Quantitative Aptitude and Reasoning.** PHI learning Pvt Ltd, New Delhi.

17UMT43A	CORE –VII: MECHANICS	SEMESTER – IV

PREAMBLE:

1. This course aims to provide models for some real life problems.
2. To provide a strong foundation in understanding the concepts of mechanism. To know how the friction is regulating the motion of objects.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about basic concepts of mechanics.	K1
CO 2	Relate the different components of forces.	K2
CO 3	Apply equilibrium condition to coplanar and couple of forces.	K2
CO 4	Solving simple harmonic problems.	K3
CO 5	Construct motion of a particle using simple pendulum.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	M	S	M	S	S
CO 2	S	S	S	M	S
CO 3	M	S	M	S	S
CO 4	S	M	S	S	M
CO 5	S	S	S	M	S

S- Strong; M-Medium; L-Low

17UMT43A	CORE –VII: MECHANICS	SEMESTER – IV

Credits:4
Hours Per Week:4

CONTENTS

UNIT - I

Resultant and Components: Definition – Parallelogram of forces- Analytic expression for the resultant of two forces acting at a point- Triangle of forces- Perpendicular Triangle of forces- Converse of the Triangle of Forces - The polygon of forces- Lami's theorem-Resolution of a force- Components of a force along two given directions – Theorem on Resolved Parts – Resultant of any number of forces acting at a point: Graphical and Analytical Method - Conditions of equilibrium of any number of forces acting upon a particle.

UNIT - II

Coplanar forces: Reduction of Coplanar Forces in General - Reduction of any number of coplanar forces – Conditions for a system of forces to reduce to a single force or to a couple – Alternative conditions for a system of forces to reduce to a single force or to a couple – Change of the base-point – Equation to the line of action of the resultant- Conditions of equilibrium of a system of coplanar forces.

UNIT - III

Virtual work: Work-Method of virtual work-Principle of virtual work for a system of coplanar forces acting on a body-Forces which may be omitted in forming the equation of virtual work-work done by an extensible string-work done by the weight of a body-Application of the principle of virtual work. Stability of Equilibrium: Stable, unstable and natural equilibrium-Nature of equilibrium of a rigid body supported at one fixed point-Conditions of stability for a body with one degree of freedom.

UNIT - IV

Projectiles: Two fundamental principles- path of a projectile-charateristics of the motion of a projectile: Greatest height- time of flight-range on the horizontal plane through the point of projection-range on an inclined plane-maximum range - motion on the surface of the smooth inclined plane.

UNIT - V

Simple Harmonic Motion: Introduction – Simple Harmonic Motion (S.H.M) in a straight line - General Solution- Geometrical representation – Change of origin - Composition of two Simple Harmonic Motions of the same period in the same straight line and in two perpendicular directions. Motion of a particle suspended by a spiral spring – Horizondal Osillations of a particle – Simple pendulum - Period of Oscillation – Equivalent simple pendulum – Loss or gain of oscillations.

TEXT BOOKS:

1. *.Venkataraman. M.K.*2012. **Statics.** Agasthiar Publications, Trichy.
   Unit - I : Chapter 2
   Unit - II : Chapter 6
   Unit - III : Chapter 9 and 10
2. *Venkataraman .M.K.2012.* **Dynamics.** 11th Edition. Agasthiar Publications. Trichy.
   Unit - IV : Chapter 6 (Sec 6.1-6.16)
   Unit - V : Chapter 10

REFERENCE BOOKS :

1. *Vittal P.R and Anantha Narayanan V. 2014* **. Dynamics.**Margham Publications.
2. *Bali.N.P*.2007.**STATICS.** Lakshmi Publications (P) Ltd.
3. *Raisinghania M.D.2006.***Dynamics** . S.Chand Publishing Company.

17UMT43B	CORE –VIII: PROGRAMMING IN C	SEMESTER– IV

PREAMBLE:

1. On successful completion of the course the students should have: learnt the basic structure, operators and statements of C language.
2. Learnt the decision making statements and to solve the problems based on it. Learnt arrays, functions and solve the problems regarding about it.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Understand the basic concepts of C.	K1
CO 2	Relate different types of operators.	K2
CO 3	Knowledge on control statements and Array functions.	K2
CO 4	Construct loop statements.	K3
CO 5	Develop simple coding program to arrays and loop.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	M	S	M	S	S
CO 2	S	S	S	M	S
CO 3	M	S	M	S	S
CO 4	S	M	S	S	M
CO 5	S	S	S	M	S

S- Strong; M-Medium ;L-Low

17UMT43B	CORE –VIII: PROGRAMMING IN C	SEMESTER– IV

Credits: 3
Hours Per Week: 3

CONTENTS

UNIT - I

Introduction – Importance of C Basic structure of C program - Character set – C tokens - Constants – Keywords and identifiers – Constants - Variables Data types – Declaration of variables

UNIT - II

Introduction – Arithmetic operators - Relational operators - logical operators – assignment operators –increment and decrement operates – Conditional operators – Bitwise operator - Special operators – Arithmetic expressions –Evaluation of expressions –Precedence of arithmetic operators – Some computational problems –Type conversion in expressions

UNIT - III

Introduction – 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 ? Operator –The GOTO statement.

UNIT - IV

Introduction – The WHILE statement - the DO statement the FOR statement –Jumps in loops.

UNIT - V

Introduction – One and Two dimensional arrays – Initializing two dimensional arrays – Multidimensional arrays

TEXT BOOK:

1. *Balagurusamy, E. 2014.* **Programming in ANSI C** Second Edition. Tata McGraw –Hill Publishing company limited, New Delhi.

   Unit - I : Chapter 1 and 2 (Sec 1.1-1.4 and 2.2-2.8).

   Unit - II : Chapter 3 (Sec 3.1-3.14)

   Unit - III : Chapter 5 (Sec 5.1-5.9)

   Unit - IV : Chapter 6 (Sec 6.1-6.5)

   Unit - V : Chapter 7 (Sec 7.2-7.5)

REFERENCE BOOK:

1. *Byron Gottfried*.1998 **Programming with C**. Tata McGrawHill publishing company.

17UMT43P	CORE LAB-I: PROGRAMMING IN C	SEMESTER– IV

PREAMBLE:

1. On successful completion of the course the students should have: learnt the basic structure, operators and statements of C language.
2. Learnt the decision making statements and to solve the problems based on it. Learnt arrays, functions and solve the problems regarding about it.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	Course Content	Knowledge Level
CO1	Prepare a C document	**K1**
CO2	Type a mathematical equations	**K2**
CO3	Solve for Various Numerical Equation	**K3**
CO4	Learn the basic concepts of C programming	**K4**
CO5	Solve mathematical equations	**K5**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	L	S	L	M
CO2	S	S	S	M	M
CO3	S	S	S	M	M
CO4	L	S	S	S	M
CO5	L	S	S	S	M

S-Strong; M-Medium; L-Low

17UMT43P	CORE LAB-I: PROGRAMMING IN C	SEMESTER– IV

Credits:2
Hours Per Week:4

1. Write a C Program to check whether the given number is odd or even
2. Write a C Program to solve the quadratic equation
3. Write a C program to convert the *Fahrenheit to Celsius*
4. Write a C program to check whether the given number is prime or not
5. Write a C program to find the sum of two matrices.
6. Write a C program to find the product of two matrices
7. Write a C program to find the inverse of a given matrix
8. Write a C program to sort the matrix rows and columns
9. Write a C program to interchange the main diagonal elements of a matrix with the elements of the secondary diagonal of the matrix.
10. Write a C program to check whether the given matrix is a identity matrix or not.
11. Write a C program to find the real root of the polynomial using Bisection method
12. Write a C program to find the real root of the polynomial using Newton-Raphson method
13. Write a C program to interpolate a value between tabulated points using Newton's forward interpolation method
14. Write a C program to interpolate a value between tabulated points using Newton's backward interpolation method

15. Write a C program to solve the system of equations using Gauss Elimination method.
16. Write a C program to solve the system of equations using Gauss Jacobi method
17. Write a C program to solve the first order ordinary differential equation using Euler method
18. Write a C program to solve the first order ordinary differential equation using Runge-Kutta method

17UMT4SA	SKILL BASED SUBJECT –II: QUANTITATIVE APTITUDE II	SEMESTER-IV

PREAMBLE:

1. On successful completion of this course the students should gain knowledge about the aptitude.
2. Solving questions by various methods.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about the various numbers and to find the highest common factor and lowest common multiple and also to find the relationship between the persons	K1
CO 2	Determine the directions and the distance from the initial point	K1
CO 3	Determine the seating positions of given members	K2
CO 4	Determine the days and also percentage , ratio by using given data.	K2
CO 5	Solve the questions by using the given time.	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	M
CO 2	S	S	S	S	M
CO 3	S	M	S	S	S
CO 4	S	S	M	S	S
CO 5	S	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT4SA	SKILL BASED SUBJECT –II: QUANTITATIVE APTITUDE II	SEMESTER – IV

Credits: 3
Hours Per Week: 3

CONTENTS

UNIT – I

Numbers – Average - HCF and LCM - Ages - Probability - Blood relation

UNIT – II

Time and work - Time and distance - Boats and Streams - Pipes and cisterns-Coding and decoding - Number series - Directions - Problems on trains

UNIT - III

Percentage - Ratio and proportion - Permutation and combination - Seating arrangement - Mensuration

UNIT - IV

Clock and calendar - Venn diagram - Data interpretation - Simple interest and Compound interest

UNIT - V

Profit and loss - Puzzles - Visual reasoning - Syllogism - Cubes

TEXT BOOKS:

1. *Agarwal, R.S.* 2015. **Quantitative Aptitude.** Revised Edition. S. Chand and Company Ltd, Ram Nagar, New Delhi -55.
2. Praveen R.V.2013. **Quantitative Aptitude and Logical reasoning.PHI Learning (P) Ltd. Delhi**

REFERENCE BOOK:

1. *Abhijit Guha*. 2004. **Quantitative Techniques**. S. Chand and Company Ltd, Ram Nagar, New Delhi -55.

17UMT4AA	ALLIED-IV: MATHEMATICAL STATISTICS -II	SEMESTER-IV

PREAMBLE:

1. On successful completion of this course the students should understood the concepts of various discrete and continuous probability distributions.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about Discrete Probability Distribution	**K1**
CO 2	Learn the concept of Continuous Probability Distribution	**K1**
CO 3	Apply the concept of Continuous Probability Distribution	**K2**
CO 4	Apply the concept Exact Sampling Distributions	**K2**
CO 5	Solve the problems related to Discrete and Continuous Probability Distribution.	**K3**

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	S	S	S
CO 2	S	S	S	S	S
CO 3	S	S	S	S	S
CO 4	S	S	S	M	M
CO 5	S	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT4AA	ALLIED-IV: MATHEMATICAL STATISTICS -II	SEMESTER- IV

Credits: 4
Hours Per Week:4

CONTENTS

UNIT - I

Discrete Probability distribution: Uniform distribution-Bernoulli distribution-Binomial distribution – Moments of Binomial distribution-Recurrence relation for the Moments of Binomial distribution –Mean deviation about mean of Binomial distribution- Mode of Binomial distribution- Moment generating functions of Binomial distribution-Additive property of Binomial distribution. Poisson distribution – Moments of Poisson distribution-Mode of Poisson distribution-Moment generating functions of Poisson distribution – Characteristic functions of Poisson distribution - Additive property of Poisson distribution – Recurrence formula for the probability of Poisson distribution.

UNIT - II

Continuous probability distributions: Introduction-Normal distribution – Moment generating functions of Normal distribution-Mode of Normal distribution-Median of Normal distribution- Mean deviation about mean of Normal distribution- Additive property of Normal distribution- – Rectangular distribution- Moment of Rectangular distribution - Moment generating functions of Rectangular distribution- Characteristic functions of Rectangular distribution - Mean deviation about mean of Rectangular distribution- Gamma distribution - Moment generating functions Gamma distribution -Characteristic functions of Gamma distribution - Additive property of Gamma distribution.

UNIT - III

Exact Sampling Distributions-I: Chi-square distribution- Derivation of Chi-square distribution- Moment generating functions Chi-square distribution- Cumulants generating functions Chi square distribution- Limiting form of Chi-square distribution for large degrees of freedom- Additive property of Chi-square distribution- Characteristic functions Chi-square distribution- Mode and Skewness of Chi-square distribution- Chi-square probability curve-some theorems on Chi-square distribution.

UNIT - IV

Exact Sampling Distributions-II: Introduction- Students t- distribution- Derivation of Students t- distribution –Constants of Students t- distribution – Fisher's t- distribution- distribution of Fisher's t- distribution – Limiting form of t- distribution – Graph of t- distribution – Critical value of t.

UNIT - V

F-distribution – Derivation of F-distribution- Constants of F-distribution –Mode and Points of inflexion of F-distribution –Relation between F and Chi-square distribution- Relation between t and F distribution- Fisher's Z-distribution.

TEXT BOOKS:

1. *Gupta, S.C and V.K.Kapoor*. 2007. **Fundamentals of Mathematical Statistics**, S. **C**hand and Co New Delhi.

   UNIT - I : Chapter 8 : Sec 8.1 – 8.3, 8.4(8.4.1-8.4.2, 8.4.4-8.4.8), 8.5(8.5.2-8.5.6, 8.5.8, 8.5.10)

   UNIT - II : Chapter 9 : Sec 9.1-9.2.(9.2.2-9.2.5, 9.2.7, 9.2.10,) 9.3 & 9.5.

   UNIT - III : Chapter 15: Sec 15.1-15.4

   UNIT - IV : Chapter 16: Sec 16.1-16.2

   UNIT - V : Chapter 16**:** Sec 16.5, 16.7-16.9

REFERENCE BOOKS:

1. *Kapur, J.M and Saxena*, H.C. 2001. **Mathematical Statistics.** S.Chand & Co, New Delhi.
2. *Gupta, C.B and Vijay Gupta*.2007.**Introduction to Statistical Methods.** S.Chand & Co, New Delhi.
3. *Veerarajan, T.* 2017, **Fundamentals of Mathematical Statistics**, Yes Dee Publishing Pvt Ltd, Chennai.

17UNM44Y	NMEC-II: APTITUDE - II	SEMESTER–IV

PREAMBLE:

1. To enable students gain fundamental knowledge about the Mathematical skills
2. To explain the extent of the application of analytical skills.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about speed and Time	K1
CO 2	Determine the Profit and Loss	K2
CO 3	Solving Area Problems	K3
CO 4	Solving Volume Problems	K3
CO 5	Learn about ordering.	K1

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	M
CO 2	S	S	S	S	M
CO 3	S	M	S	S	S
CO 4	S	S	M	S	S
CO 5	S	S	S	S	S

S- Strong; M-Medium; L-Low

17UNM44Y	NMEC-II: APTITUDE - II	SEMESTER–IV

Credits: 2
Hours Per Week: 2

CONTENTS

UNIT – I

Problems on Trains – Speed – Distance – Time – Conversion between Kilometer and Meter – Average Speed - Boats and streams – Same Directions – Opposite Directions.

UNIT - II

Simple Interest – Principal – Interest – Number of Years – Rate of Interest - Amount. Compound Interest – Principal – Interest – Number of years – Rate of Interest – Annual – Quarterly – Half yearly – Present Worth – Different Rate of Interest for Years – Difference between Compound Interest and Simple Interest.

UNIT - III

Area – Fundamental Concepts – Formulae - Square, Rectangle, Sphere, Cone, Cylinder and Circle – Applications and Solving Problems.

UNIT - IV

Volume and Surface Areas – Fundamental Concepts – Formulae – Cube, Cuboids, Sphere, Semi Sphere, Cone and Cylinder.

UNIT -V

Calendar - Calendar – Odd Days – Leap year – Ordinary Year – Counting of odd days – Days of the week related to odd days - Permutations and Combinations – Factorial Notation – Permutations – Number of Permutations – Number of Combinations.

TEXT BOOK:

Agarwal , R.S.2015. **Quantitative Aptitude.** S. Chand and Company Ltd, New Delhi.

REFERENCE BOOK:

Abhijit Guha. 2004. **Quantitative Techniques**. S. Chand and Company Ltd, New Delhi.

17UMT53A	CORE – IX: REAL ANALYSIS - I	SEMESTER – V

PREAMBLE:

1. The students should gain the knowledge about real and complex numbers, sets and metric space.
2. The students should gain the knowledge about The Riemann - Stieltjes integral.

COURSE OUTCOMES:

On the successful completion of the course, the students will able to

CO Number	CO Statement	Knowledge Level
CO 1	Define the real numbers, least upper bounds, and the triangle inequality	K1
CO 2	Know the concept and properties of set theory	K2
CO 3	Understand the concept of accumulation and adherent points	K3
CO 4	Prove statements related to the convergence of covering and metric space	K2
CO 5	Prove statements related to the limit and continuity	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	S	S	S
CO 2	S	S	S	S	S
CO 3	S	S	S	S	S
CO 4	S	S	S	M	M
CO 5	S	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT53A	CORE – IX: REAL ANALYSIS - I	SEMESTER – V

Credits: 5
Hours Per Week: 6

CONTENTS

UNIT – I

The Real and Complex Number System: Introduction -The field axioms – The order axioms – Geometric representation of real numbers – Intervals – Integers – The unique factorization theorem for integers – Rational numbers – Irrational numbers – Upper bounds, maximum element, least upper bound (supremum) – The completeness axiom – Some properties of the supremum; Properties of the integers deduced from the completeness axiom – The Archimedean property of the real number system – Rational numbers with finite decimal representation – Finite decimal approximation to real numbers – Infinite decimal representation of real numbers – Absolute values and the triangle inequality – The Cauchy-Schwarz inequality – Plus and minus infinity and the extended real number system R^* .

UNIT - II

Basic Notions of Set Theory: Introduction - Notations – Ordered pairs – Cartesian product of two sets – Relations and functions – Further terminology concerning functions – One-to-one functions and inverses – Composite functions – Sequences – Similar (equinumerous) sets – Finite and Infinite sets – Countable and Uncountable sets – Uncountability of the real number system – Set algebra – Countable collection of countable sets.

UNIT - III

Elements of point set topology: Introduction - Euclidean space R^n –Open balls and open sets in R^n - The structure of open sets in R^1 - Closed sets – Adherent points – Accumulation points – Closed sets and Adherent points – The Bolzano – Weierstrass theorem – The Cantors intersection theorem.

UNIT - IV

Elements of point set topology: The Lindelof covering theorem – The Heine-Borel covering theorem – Compactness in R^n - Metric spaces – Point set topology in metric spaces – Compact subsets of a metric space – Boundary of a set.

UNIT - V

Limits and Continuity: Introduction - Convergent sequences in a metric space – Cauchy sequences – Complete metric spaces – Limit of a function – Limit of vector – valued functions – Continuous functions – Continuity of composite functions – Examples of continuous functions.

TEXT BOOK:

1. *Apostol T. M*. 2002. **Mathematical Analysis.** Narosa Publishing Company. Second Editon.

UNIT - I : Chapter 1: Sec 1.1 – 1.20

UNIT – II : Chapter 2: Sec 2.1 – 2.15

UNIT – III : Chapter 3: Sec 3.1 – 3.9

UNIT – IV : Chapter 3: Sec 3.10 – 3.16

UNIT - V : Chapter 4: Sec 4.1 – 4.5, 4.7 – 4.9 , 4.11

REFERENCE BOOKS:

1. *Walter Rudin*.1976. **Principles of Mathematical Analysis**. McGraw Hill.
2. *Santhi Narayan and Dr. Raisinghania, M. D*. 2003. **Elements of Real Analysis**. S. Chand & Company Pvt Ltd, New Delhi.

17UMT53B	CORE -X : COMPLEX ANALYSIS - I	SEMESTER – V

PREMABLE:

1. To gained knowledge about the integration method for complex functions.

2. The students will have knowledge about singularities and method to find them with its applications.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Complex plane and Sets of complex points	**K1**
CO2	To understand the Analytic functions	**K2**
CO3	To understand the Power Series and Elementary Functions	**K2**
CO4	Apply the Elementary and conformal mappings	**K3**
CO5	Apply the Complex Integration	**K3**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	M	S
CO5	S	S	S	S	M

S-Strong; M-Medium; L-Low

17UMT53B	CORE -X : COMPLEX ANALYSIS - I	SEMESTER – V

Credits: 4
Hour Per Week: 5

CONTENTS

UNIT – I

Complex plane: Angle between two rays – Equations of Straight Lines and Circles – Elementary Transformation – Infinity and Extended Complex Plane – Stereographic Projection. **Sets of complex points:** Closed Sets – Open Sets – Theorems on Bounded Infinite Sets - Examples.

UNIT – II

Analytic functions: Complex Functions - Limit of a Function – Continuity of a Function – Uniform Continuity – Differentiability and Analyticity of a Function – Necessary Conditions for Differentiability – Sufficient Conditions for Differentiability – C-R Equation in Polar Coordinates – Examples.

UNIT - III

Power Series: Power Series - Absolute Convergence – Uniform Convergence - Analyticity of the Sum of Power Series – Uniqueness of Representation of a Function by a Power Series. **Elementary Functions:** Exponential Functions – Lograthmic Functions And Function a^z - Branch Point – Harmonic Functions – Examples.

UNIT – IV

Elementary and conformal mappings: Bilinear Transformation – Special Bilinear Transformations – Circles And Inverse Points – Transformations $w = z^2, w = \sqrt{z}\ , w = e^z, w = z + 1/z, w = \log z, w = \sin z \text{ and } w = \cos z$ - Conformal Mappings – Examples.

UNIT-V

Complex Integration: Simple Rectifiable Oriented Curves – Integration of Complex Functions – Simple Integrals Using Definitions – Definite Integrals – Interior And Exterior of Closed Curve - Simply Connected Region – Cauchy's Fundamental Theorem – Integral Along an Arc Joining Two Points – Simple Problems.

TEXT BOOK:

1. *Durai Pandian , Kayalal Pachaiyappa.* 2014. **Complex Analysis**. S.Chand and Company Chennai.

   Unit - I : Chapter 2 (Sections 2.4 to 2.10, Chapter 3 Sections 3.1 to 3.3)

   Unit - II : Chapter 4 (Sections 4.1 to 4.10)

   Unit - III : Chapter 6 (Sections 6.1 to 6.9; and 6.12 , 6.13)

   Unit - IV : Chapter 7 (Sections 7.1 to 7.10)

   Unit - V : Chapter 8 (Sections 8.1 to 8.8)

REFERENCE BOOKS:

1. *Shanthi Narayan and Mittal. P.K.* 2008. **Theory of functions of complex variables.** S. Chand and Company New Delhi.

2. *Pundir S.K. Gupta K.P. Goyal J.K. 2014.* **Complex Analysis.** Pragati Prakashan (Meerut)

17UMT53C	CORE –XI:ABSTRACT ALGEBRA	SEMESTER – V

PREAMBLE:

1. The students should have concrete knowledge about the abstract thinking like sets, groups etc.
2. To know about the concept of rings by proving theorems and its applications.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about Set theory	K1
CO 2	Understand the Subgroups	K2
CO 3	Learn about Homomorphisms	K2
CO 4	Learn about Rings	K2
CO 5	Learn about Ideals and Quotient Rings	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	S	S	M
CO 2	S	M	S	S	S
CO 3	S	S	S	M	S
CO 4	S	S	S	S	S
CO 5	M	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT53C	CORE –XI:ABSTRACT ALGEBRA	SEMESTER – V

Total Credits: 4
Hours Per Week: 6

CONTENTS

UNIT - I

Preliminary Notions: Set theory – Mappings – examples of mappings - The integers - Unique factorization theorem. **Group Theory**: Definition of a group - Some examples of groups- Some preliminary lemmas.

UNIT - II

Group Theory: Subgroups – A Counting Principle - Normal Subgroups and Quotient Groups.

UNIT - III

Group Theory: Homomorphisms – Automorphisms – Cayley's theorem - Permutation groups.

UNIT - IV

Ring Theory: Definition and Examples of Rings–Some Special Classes of Rings – Homomorphisms.

UNIT - V

Ring Theory: Ideals and Quotient Rings – More Ideals and Quotient Rings – The field of Quotients of an Integral Domain – Euclidean Ring.

TEXT BOOK:

1.*Herstein, I.N. 2007.* **Topics in Algebra.** John Wiley & Sons, New York.

Unit - I : Chapter 1 (Sections 1.1 to 1.3)
Chapter 2 (Sections 2.1 to 2.3)

Unit - II : Chapter 2 (Sections 2.4 to 2.6)

Unit - III : Chapter 2 (Sections 2.7 to 2.10)

Unit - IV : Chapter 3 (Sections 3.1 to 3.3)

Unit - V : Chapter 3 (Sections 3.4 to 3.7)

REFERENCE BOOKS:

1. *Surjeet Singh and Qazi Zameeruddin*, 1992. **Modern Algebra.** Vikas Publishing House.
2. *Vasishtha, A.R.* 1994-95. **Modern Algebra.** Krishna Prakashan Mandir, Meerut.
3. *S. Arumugam and A.T. Isaac*, **Modern Algebra.** Scitech Publications (India) Pvt.Ltd
4. *S.G.Venkatachalapathy*, **Modern Algebra (For B.Sc Mathematics Major)**, Margham Publications,Chennai.

17UMT53D	CORE –XII: DISCRETE MATHEMATICS	SEMESTER – V

PREAMBLE:

1. On successful completion of this course the students should gain knowledge about Functions, Relations and Digraphs.
2. The learner can understand the concept of machine language and can form machine for some inputs.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	Course Content	Knowledge Level
CO1	Learn about Mathematical induction and Counting	**K1**
CO2	Applying Functions for computer science	**K2**
CO3	Understand Finite Boolean Algebra	**K3**
CO4	Learn about Finite State Machines	**K4**
CO5	Calculate paths in relations and digraphs	**K5**

Mapping with Program Outcomes

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	M
CO2	S	M	S	S	S
CO3	S	S	S	M	S
CO4	S	S	S	S	S
CO5	S	S	M	S	S

S-Strong; M-Medium; L-Low

17UMT53D	CORE –XII: DISCRETE MATHEMATICS	SEMESTER – V

Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Propositions and logical operations-Conditional statements-Methods of proof-Mathematical induction-Counting: Permutations-Combinations-Recurrence relations.

UNIT - II

Relations and Digraphs: Product sets and Partitions-Relations and digraphs – paths in relations and digraphs – properties of relations – Equivalance Relations – Operations on Relations.

UNIT – III

Functions: Functions – Functions for computer science – growth of functions – permutation functions

UNIT – IV

Order relations and Structures: Partially order sets – Extremal elements of Partially ordered sets – Lattices – Finite Boolean Algebra – Functions of Boolean Algebra.

UNIT – V

Languages and finite state machines: Languages – Representations of Special Grammars and Languages – Finite State Machines – Monoids, Machines and Languages – Simplification of Machines.

TEXT BOOK:

1. *Kolman . B, Busby. R.C. and Ross. S.C.* 2006**. Discrete Mathematical Structures.** 5th Edition. Prentice hall of india Pvt. Ltd. New Delhi.

Unit - I : Chapter 2 (Sections 2.1 to 2.4)
Chapter 3 (Sections 3.1 to 3.2 and 3.5)

Unit - II : Chapter 4 (Sections 4.1 to 4.5 and 4.7)

Unit - III : Chapter 5 (Sections 5.1 to 5.4)

Unit - IV :Chapter 6 (Sections 6.1 to 6.5)

Unit - V :Chapter 10 (Sections 10.1-10.4 to 10.6.)

REFERENCE BOOKS:

1. *Tremblay J.P and Manohar R.P* 1995**. Discrete Mathematical Structures with applications to computer science.** Mc.Graw Hill.

2. *Kenneth H. Rosen*.1999. **Discrete Mathematics and its Applications (English)** 4th Edition.McGraw-Hill Professional.

17UMT5SA	SKILL BASED SUBJECT- III: OPERATIONS RESEARCH - I	SEMESTER – V

PREAMBLE:

1. To understand the knowledge about optimal use of available resources.
2. To know about the concept of simplex and duality in linear programming.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Mathematical Formulation of the problem	**K1**
CO2	To understand the Assignment problem	**K1**
CO3	Apply the duality in linear programming	**K2**
CO4	Apply the balanced and unbalanced Transportation problem	**K2**
CO5	Solve the problems related Travelling salesman	**K2**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	M	S	S	S
CO3	S	S	S	M	S
CO4	S	S	S	S	S
CO5	S	S	M	S	S

S-Strong; M-Medium; L-Low

17UMT5SA	SKILL BASED SUBJECT- III: OPERATIONS RESEARCH - I	SEMESTER – V

Credits: 3
Hours Per Week: 3

CONTENTS

UNIT - I

Operations Research-An Overview: Origin and Development of O.R-Nature and features in O.R-Modeling in O.R-General solution methods for O.R Models-Scientific Method for O.R- Methodology and Applications of O.R .

Linear Programming Problem: Introduction-Mathematical Formulation of the problem – Graphical solutions Method – Problems.

UNIT - II

Linear Programming Problem: Introduction-The computational Procedure: Simplex Method – Use of Artificial variables- Two Phase method and Big – M Method (Method of Penalties) – Problems.

UNIT - III

Duality in Linear Programming: Introduction-General Primal-Dual Pair-Formulating a Dual Problem- Primal Dual Pair in Matrix form-Duality and Simplex Method – Dual Simplex Method – Problems.

UNIT - IV

Transportation Problems: Introduction- General Transportation Problem- The Transportation Table – solution of a Transportation Problem- Finding an Initial Basic Feasible solution-Degeneracy in Transportation problem-Transportation Algorithm (MODI Method)– unbalanced Transportation problems

UNIT - V

Assignment Problem: Introduction-Mathematical Formulation of the Problem-The Assignment Method – Unbalanced Assignment Problems - Special cases in Assignment Problem –The Travelling salesman Problem.

TEXT BOOK:

1. *Kandiswarup, P. K. Gupta. Man Mohan*. 2003. **Operations Research** . S. Chand & Sons Education Publications, New Delhi.

Unit - I : Chapter 1 (Sec 1.1-1.7)
Chapter 2 (Sec 2.1-2.2)
Chapter 3 (Sec 3.1-3.3)
Unit - II : Chapter 4 (Sec 4.1,4.3 , 4.4)
Unit - III : Chapter 5 (Sec 5.1-5.4,5.7 & 5.9)
Unit - IV : Chapter 10 (Sec 10.1-10.3,10.9,10.11,10.12)
Unit - V : Chapter 11 (Sec 11.1-11.4,11.6)

REFERENCE BOOK:

1. *Taha, H.A*. 2006. **Operations Research: An Introduction.** Eleventh Edition. Prentice Hall of India Private Limited, New Delhi.

17UMT63A	CORE –XIII: REAL ANALYSIS - II	SEMESTER– VI

PREAMBLE:

1. The students should gain the knowledge about limits, continuity of a function and its applications.
2. The students should gain the knowledge about The Riemann - Stieltjes integral

COURSE OUTCOMES:

On the successful completion of the course, Students will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Know the concept of Topological mappings and Bolzano's theorem	K1
CO 2	Understand the concept of Connectedness, Uniform continuity and Discontinuity	K2
CO 3	Prove the Rolle's theorem, Mean- Value theorem for and Intermediate-value theorem	K3
CO 4	Know the concept of bounded variation and total variation	K2
CO 5	Determine the Riemann integrability and the Riemann-Stieltjes integrability of a bounded function and prove a selection of theorems concerning integration	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	S	S	S
CO 2	S	S	S	S	S
CO 3	S	S	S	S	S
CO 4	S	S	S	M	M
CO 5	S	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT63A	CORE –XIII: REAL ANALYSIS - II	SEMESTER– VI

Credits: 5
Hours Per Week: 6

CONTENTS

UNIT - I

Limits and Continuity: Continuity and inverse images of open or closed sets – Functions continuous on compact sets – Topological mappings (homeomorphisms) – Bolzano's theorem.

UNIT - II

Limits and Continuity: Connectedness – Components of a metric space – Arcwise connectedness - Uniform continuity- Uniform continuity and compact sets – Fixed point theorem for contraction – Discontinuities of real-valued functions– Monotonic functions.

UNIT - III

Derivatives: Introduction**-** Definition of derivative – Derivatives and continuity – Algebra of derivatives – The chain rule – one-sided derivatives and infinite derivatives – Functions with non-zero derivative – Zero derivatives and local extrema - Rolle's theorem – The Mean- Value theorem for derivatives –Intermediate-value theorem for derivatives – Taylor's formula with remainder.

UNIT - IV

Function of Bounded Variation: Introduction - Properties of monotonic functions – Functions of bounded variation – Total variation – Additive property of total variation – Total variation on $[a, x]$as a function of x - Functions of bounded variation expressed as the difference of increasing functions – Continuous functions of bounded variation.

UNIT - V

The Riemann – Stieltjes Integral: Introduction- Notation – The definition of Riemann-Stieltjes integral – Linear properties – Integration by parts – Change of variables in a Reimann-Stieltjes Integral – Reduction to a Riemann Integral.

TEXT BOOK:

1. Apostol . T. M. 2002. **Mathematical Analysis**. Narosa Publishing Company. Second Editon.

UNIT - I : Chapter 4 (Sec 4.12 – 4.15)

UNIT - II : Chapter 4 (Sec 4.16 – 4.23)

UNIT - III : Chapter 5 (Sec 5.1 – 5.12)

UNIT – IV : Chapter 6 (Sec 6.1 – 6.8)

UNIT - V : Chapter 7 (Sec 7.1 – 7.7)

REFERENCE BOOKS:

1. *Walter Rudin.*1976. **Principles of Mathematical Analysis**.Third Edition. McGraw Hill.
2. *Santhi Narayan and Dr. Raisinghania, M.D. 2003.* **Elements of Real Analysis**. S.Chand & Company Pvt Ltd. New Delhi.

17UMT63B	CORE – XIV: COMPLEX ANALYSIS - II	SEMESTER– VI

PREAMBLE:

1. To gained knowledge about the integration method for complex functions.
2. The students will have knowledge about singularities and method to find them with its applications.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Complex integration	**K1**
CO2	To understand the Taylor's series and Laurent's series	**K2**
CO3	To understand the Singularities	**K2**
CO4	Apply the Residues	**K3**
CO5	Apply the Meromorphic Functions	**K3**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	S	S	S	M
CO3	S	S	S	M	S
CO4	S	S	S	M	S
CO5	S	S	S	S	M

S-Strong; M-Medium; L-Low

17UMT63B	CORE – XIV: COMPLEX ANALYSIS - II	SEMESTER– VI

Credits: 4
Hours Per Week: 5

CONTENTS

UNIT - I

Complex integration: Cauchy's Integral Formula and Formulas for Derivatives - Zeros of a Function – Related Integral Theorem – Term by Term Differentiation and Integration of Uniformly Convergent Series – Examples.

UNIT - II

Taylor's series and Laurent's series: Taylor's Series – Zeros of an Analytic Function – Laurent's Series - Cauchy's Product and Division – Examples.

UNIT –III

Singularities: Singularity – Isolated Singularities – Removable Singularity – Pole-Essential Singularity – Behaviour of a Function at an Isolated Singularity – Determination of the Nature of Singularities – Nature of Singularity at Infinity – Examples.

UNIT- IV

Residues: Residues – Calculation of Residues – Real Definite Integral – Examples .

UNIT -V

Meromorphic Functions: Meromorphic Functions – Function Meromorphic in the Extended Plane – Examples.

TEXT BOOK:

1. *Durai Pandian , kayalal pachaiyappa*. 2014. **Complex Analysis**. S. Chand and Company Pvt Ltd.

   Unit - I : Chapter 8 Sec 8.9 to 8.13

   Unit - II : Chapter 9 Sec 9.1 to 9.4 and 9.13

   Unit - III : Chapter 9 Sec 9.5 to 9.13

   Unit - IV : Chapter 10 Sec 10.1 to 10.4

   Unit - V : Chapter 11 Sec 11.1 to 11.3

REFERENCE BOOKS:

1. *Shanthi Narayan and Mittal .P.K* . 2008. **Theory of functions of complex variables.** S.Chand and Company New Delhi.
2. *Pundir S.K. Gupta K.P. Goyal J.K. 2014.* **Complex Analysis.** Pragati Prakashan (Meerut)

17UMT63C	CORE – XV: LINEAR ALGEBRA	SEMESTER– VI

PREAMBLE:

1. To understand the abstract thinking like vector space, dual spaces.

2. To know about the concepts of linear transformations by proving theorems along their properties.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Linear Equations and Vector space	**K1**
CO2	To understand the Linear transformations	**K2**
CO3	To understand the Lagrange interpolation	**K2**
CO4	Apply the Determinants and Elementary Canonical Forms	**K3**
CO5	Apply the Inner Product Spaces	**K3**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	S
CO2	S	M	S	S	S
CO3	S	S	S	M	S
CO4	S	S	S	M	S
CO5	S	S	M	S	S

S-Strong; M-Medium; L-Low

17UMT63C	CORE – XV: LINEAR ALGEBRA	SEMESTER– VI

Credits: 4
Hours Per Week: 6

CONTENTS

UNIT - I

Linear Equations: Fields – Systems of Linear Equations – Matrices ad Element row operations – Row reduced Echelon matrices – Matrix multiplication – Invertible matrices.

Vector Spaces: Vector spaces – subspaces – Bases and dimensions – Coordinates – Summary of row equivalence – Computations concerning subspaces.

UNIT - II

Linear transformations: Linear transformations – The algebra of linear transformations – Isomorphism – representation of transformations by matrices – Linear functional – The double dual – The transpose of a linear transformations.

UNIT - III

Polynomial: Algebras – The algebra of polynomials – Lagrange interpolation – Polynomial ideals – The prime factorization of a polynomial.

UNIT - IV

Determinants: Commutative rings – Determinant functions- Permutations and the uniqueness of determinants – Additional properties of determinants – Modulus.

Elementary Canonical Forms: Introduction – Characteristic values – Annihilating polynomials – Invariant subspaces.

UNIT - V

Inner Product Spaces: Inner products – Inner product spaces – Linear functional and adjoints – Unitary operators – Normal operators.

TEXT BOOK:

1. *Keneth Hoffman and Ray Kunze*. 2006**.Linear Algebra**. Second Edition, Printice Hall of India Private Limited. New Delhi.

Unit - I	: Chapter 1 (Sections 1.1-1.6)
	Chapter 2 (Sections 2.1-2.6)
Unit - II	: Chapter 3 (Sections 3.1-3.7)
Unit - III	: Chapter 4 (Sections 4.1-4.5)
Unit - IV	: Chapter 5 (Sections 5.1-5.5)
	Chapter 6 (Sections 6.1-6.4)
Unit - V	: Chapter 8 (Sections 8.1-8.5)

REFERENCE BOOKS:

1. *Herstein, I.N.2002.* **Topics in Algebra** (II Edition)**.** Narosa Publishing House, New Delhi.
2. *Serge Lang . 2011.* **Linear Algebra** (Third Edition)Springer Verlag Publisher House.

17UMT6SA	SKILL BASED SUBJECT- IV: OPERATIONS RESEARCH - II	SEMESTER– VI

PREAMBLE:

1. To enhance student knowledge in game theory
2. To enhance student knowledge in Network scheduling with application.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Sequencing problem	**K1**
CO2	To understand about the game theory	**K1**
CO3	Apply the Dominance Property	**K2**
CO4	Apply the Queuing theory problem	**K2**
CO5	Solve the problems related PERT / CPM	**K3**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	S	M	S
CO3	S	M	S	S	S
CO4	S	S	M	S	S
CO5	M	S	S	S	S

S-Strong; M-Medium; L-Low

17UMT6SA	SKILL BASED SUBJECT- IV: OPERATIONS RESEARCH - II	SEMESTER– VI

Credits: 3

Hours Per Week: 3

CONTENTS

UNIT - I

Sequencing Problem: Introduction-Problems of Sequencing-Basic term used in Sequencing-Processing n jobs through Two Machines - Processing n jobs through k Machines - Processing 2 jobs through k Machines- Maintenance Crew Scheduling.

UNIT - II

Game theory: Introduction-Two person zero sum game – The Maxmini – Minimax principle – Games without saddle point –Mixed Strategies – Graphic Solution of $2 \times n$ and $m \times 2$ Games – Domination Property – Problems

UNIT - III

Replacement problem: Introduction-Replacement of equipment/asset that deteriorates gradually – Replacement of equipment that fails suddenly.

UNIT – IV

Queuing Theory: Introduction – Queuing system – Element and Operating

Characteristics of Queuing system – Classifications of Queuing Models – Definition of Transient and Steady state Problems in $(M/M/1):(\infty/FIFO)$; $(M/M/1):(N/FIFO)$; $(M/M/C):(\infty/FIFO)$; $(M/M/C):(N/FIFO)$ Models.

UNIT - V

Network scheduling by PERT / CPM : Introduction – Network and basic components – Logical Sequencing - Rules of Network construction – Critical Path Analysis – Probability Consideration in PERT- Distinction Between PERT and CPM.

TEXT BOOK:

1. *Kandiswarup. Gupta, P. K and Man Mohan.*2003. **Operations Research**. S. Chand & Sons Education Publications, New Delhi, 11th Revised edition.

   Unit - I : Chapter 12 (Sec 12.1-12.7)

   Unit - II : Chapter 17 (Sec 17.1-17.7)

   Unit - III : Chapter 18(Sec 18.1-18.3)

   Unit - IV : Chapter 20 (Sec 20.1-20.4,20.6-20.8)

   Unit - V : Chapter 21 (Sec 21.1-21.7)

REFERENCE BOOK:

1. *Taha, H.A.* 2006. **Operations Research: An Introduction.** Eighth Edition. Prentice Hall of India Private Limited, New Delhi.

17UMT5EA	ELECTIVE – I: FUZZY LOGIC	SEMESTER - V

Credits: 4
Hours Per Week: 5

PREAMBLE:

1. To introduce the concept of soft computing to the students, to take up research projects in these areas
2. To enable the students to apply the soft computing methodologies in their fields of Work

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	Course Content	Knowledge Level
CO1	Know the Crisp sets and functions	**K1**
CO2	Understand the concept of Fuzzy Associative Memories	**K2**
CO3	Know the models for Fuzzy Quantifiers and Fuzzy inference	**K3**
CO4	Understand the Method of steepest Descent	**K4**
CO5	Analyze the Fundamentals Of Neural Network	**K5**

Mapping with Program Outcomes

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	M	S	S
CO3	M	S	S	S	S
CO4	S	S	S	M	S
CO5	S	M	S	S	S

S-Strong; m-Medium; L-Low

17UMT5EA	ELECTIVE – I: FUZZY LOGIC	SEMESTER - V

Credits: 4
Hours Per Week: 5

CONTENTS

UNIT - I

Fuzzy set theory: Fuzzy versus crisp- Crisp sets: Operations on crisp sets – Properties of crisp sets – Partition and covering .Fuzzy sets: Membership function basic fuzzy set operations – Properties of fuzzy sets. Crisp relations: Cartesian product – Other crisp relations – Operations on fuzzy relations. Fuzzy relations: Fuzzy Cartesian product – Operations on fuzzy relations.

UNIT - II

Fuzzy systems: Crisp Logic: Laws of prepositional Logic- Inference in prepositional Logic. Predicate Logic : Interpretations of Predicate Logic formula – Inference in predicate Logic . Fuzzy logic : Fuzzy Quantifiers – Fuzzy inference – Fuzzy rule based System – Defuzzification Methods – Applications.

UNIT - III

Fuzzy Associative Memories : FAM an introduction – Single Association FAM: Graphical method of inference – Correlation Matrix Encoding . Fuzzy Hebb FAMS- FAM involving a rule base – FAM Rules with multiple Antecedents / Consequents: Decomposition rules. Applications.

UNIT - IV

Fundamentals Of Neural Network: Basic Concepts of Neural Networks – Human Brain – Model of an Artificial Neuron – Neural Network

Architectures: Single Layer Feed Forward Network – Mutlilayer Feed forward Network – Recurrent Networks .Characteristic of neural Networks – Learning Methods – Taxonomy of neural Network Architectures – History of neural Network Research – Early neural Network Architectures – Rosenblatt's percetron – ADALINE network – MADALINE Network – Some Application Domains.

UNIT - V

Back Propagation Networks: Architecture of a Back Propagation Network: The Perceptron Model – The solution – Single Layer Artificial Neural Network. Model for Multi Perceptron .Bank Propogation Learning : Input Layer computation – Hidden Layer Computation Output Layer Computation –Calculation of Error – Training of neural network – Method of steepest Descent – Effect of learning Rate - Adding a Momentum Term – Back Propogation Algorithm.

TEXT BOOK:

1. *Rajasekaran,S and Vijayalakshmi Pai, G.A.* **Neural Networks, Fuzzy Logic and Genetic Algorithms – Synthethesis and Applications** . Prentice Hall of India Pvt. Ltd., New Delhi. 2003.

   Unit - I : Chapter 6 (6.1-6.5)

   Unit - II : Chapter 7 (Sec 7.1-7.6)

   Unit – III : Chapter 14 (Sec 14.1 and 14.6)

   Unit - IV : Chapters 2 (2.1-2.10)

   Unit - V : Chapters 3(3.1-3.2)

REFERENCE BOOK:

1. *Timothy and Ross,J.* F**uzzy Logic with Engineering Applications,** McGrow Hill 1997.

17UMT5EB	ELECTIVE – I: ASTRONOMY – I	SEMESTER – V

PREAMBLE:

1. To gain knowledge about Astronomy.
2. To know about the concept of Kepler's Laws

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Solar system	**K1**
CO2	To understand the Variation in length of the day	**K1**
CO3	To gain knowledge about the Geocentric parallex.	**K2**
CO4	Apply the Cassinis formula.	**K2**
CO5	To Compare the relation between true eccentric and mean anamolies	**K2**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	M	S	S	S
CO3	S	M	S	S	S
CO4	S	S	S	M	S
CO5	S	S	M	S	S

S-Strong; M-Medium; L-Low

17UMT5EB	ELECTIVE – I: ASTRONOMY – I	SEMESTER – V

Credits: 4
Hours Per Week: 5

CONTENTS

UNIT - I

General description of the Solar system. Comets and meteorites – Spherical trigonometry.

UNIT - II

Celestial sphere – Celestial co – ordinates – Diurnal motion – Variation in length of the day

UNIT - III

Dip – Twilight – Geocentric parallex.

UNIT - IV

Refration – Tangent formula – Cassinis formula.

UNIT - V

Kepler's laws – Relation between true eccentric and mean anamolies.

TEXT BOOK:

1. *Kumaravelu, S and Susheela Kumaravelu. 2007.* **Astronomy.** S. Chand & Sons Publications, New Delhi.

17UMT5EC	ELECTIVE-I: HISTORY OF MATHEMATICS - I	SEMESTER - V

PREAMBLE:

1. To enable students gain knowledge about the Mathematics and Mathematicians throughout the world.
2. To know about the various concepts underlying Mathematics.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Arithmetic and Logistic	**K1**
CO2	To understand the Numerals and Trigonometry	**K1**
CO3	To gain knowledge about the Euclid of Alexandria	**K2**
CO4	Apply the concept of Abacus	**K2**
CO5	To Learn about the Latin West	**K1**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	M	S	S	M
CO3	S	M	S	S	S
CO4	S	S	M	S	S
CO5	S	S	S	S	M

S-Strong; M-Medium; L-Low

17UMT5EC	ELECTIVE-I: HISTORY OF MATHEMATICS I	SEMESTER - V

Credits: 4
Hours Per Week: 5

CONTENTS

UNIT - I

Traces: Concepts and Relationships - Early Number Bases - Number Language and Counting - Spatial Relationships. **Ancient Egypt:** The Era and the Sources - Numbers and Fractions - Arithmetic Operations - "Heap" Problems - Geometric Problems - Slope Problems - Arithmetic Pragmatism. **Mesopotamia:** The Era and the Sources - Cuneiform Writing - Numbers and Fractions: Sexagesimals – Positional Numeration - Sexagesimal Fractions – Approximations – Tables – Equations - Measurements: Pythagorean Triads - Polygonal Areas - Geometry as Applied Arithmetic. **Hellenic Traditions:** The Era and the Sources - Thales and Pythagoras - Numeration - Arithmetic and Logistic - Fifth-Century Athens - Three Classical Problems.

UNIT - II

Euclid of Alexandria: Alexandria - Lost Works - Extant Works - The Elements. **Archimedes of Syracuse:** The Siege of Syracuse - On the Equilibriums of Planes - On Floating Bodies - The Sand-Reckoner - Measurement of the Circle - On Spirals - Quadrature of the Parabola - On Conoids and Spheroids - On the Sphere and Cylinder - Book of Lemmas - Semiregular Solids and Trigonometry - The Method. **Apollonius of Perge:** Works and Tradition - Lost Works - Cycles and Epicycles - The Conics.

UNIT - III

Crosscurrents: Changing Trends - Eratosthenes - Angles and Chords - Ptolemy's Almagest - Heron of Alexandria - The Decline of Greek Mathematics - Nicomachus of Gerasa - Diophantus of Alexandria - Pappus of Alexandria - The End of Alexandrian Dominance - Proclus of Alexandria Boethius - Athenian Fragments - Byzantine Mathematicians. **Ancient and Medieval China:**The Oldest Known Texts - The Nine Chapters - Rod Numerals - The Abacus and Decimal Fractions - Values of Pi - Thirteenth-Century Mathematics.

UNIT - IV

Ancient and Medieval India: Early Mathematics in India - The Sulbasutras - The Siddhantas - Aryabhata - Numerals - Trigonometry - Multiplication - Long Division - Brahmagupta - Indeterminate Equations - Bhaskara - Madhava and the Keralese School. **The Islamic Hegemony:** Arabic Conquests - The House of Wisdom - Al-Khwarizmi - 'Abd Al-Hamid ibn-Turk - Thabit ibn-Qurra - Numerals - Trigonometry - Tenth- and Eleventh-Century Highlights - Omar Khayyam - The Parallel Postulate - Nasir al-Din al-Tusi - Al-Kashi.

UNIT - V

The Latin West: Introduction - Compendia of the Dark Ages - Gerbert - The Century of Translation - Abacists and Algorists - Fibonacci - Jordanus Nemorarius - Campanus of Novara - Learning in the Thirteenth Century - Archimedes Revived - Medieval Kinematics - Thomas Bradwardine - Nicole Oresme - The Latitude of Forms - Infinite Series - Levi ben Gerson - Nicholas of Cusa - The Decline of Medieval Learning. **The European Renaissance Overview**:

Regiomontanus - Nicolas Chuquet's Triparty - Luca Pacioli's Summa - German Algebras and Arithmetics - Cardan's Ars Magna - Rafael Bombelli - Robert Recorde - Trigonometry - Geometry - Renaissance Trends - Franc¸ois Vie`te .

TEXT BOOK:

1. Uta C.Merzbach and Carl B. Boyer, (2010), A History of Mathematics, Third Edition, John Wiley & Sons, Inc.

   Unit - I : Chapters 1, 2, 3 and 4 (upto page 58)

   Unit - II : Chapters 5, 6 and 7

   Unit - III: Chapters 8 and 9

   Unit - IV: Chapters 10 and 11

   Unit - V : Chapters 12 and 13

REFERENCE BOOK:

1. *David M. Burton.*2011. **The History of Mathematics an Introduction**. Seventh Edition. McGraw-Hill.

17UMT6EA	ELECTIVE - II: AUTOMATA THEORY AND FORMAL LANGUAGES	SEMESTER-VI

PREAMBLE:

1. On successful completion of this course the students should gain knowledge about the aptitude.
2. Solving questions by various methods.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about the various structure languages	K1
CO 2	Learn about the operations	K1
CO 3	Learn about the Context free languages.	K2
CO 4	Learn about the finite state automata	K2
CO 5	Learn about the push down automata	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	M
CO 2	S	S	S	S	M
CO 3	S	M	S	S	S
CO 4	S	S	M	S	S
CO 5	S	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT6EA	ELECTIVE -II: AUTOMATA THEORY AND FORMAL LANGUAGES	SEMESTER– VI

Credits: 4
Hours Per Week: 5

OBJECTIVES:

1. On successful completion of this course the students should gain knowledge about Automata Theory
2. To know about the concept of Formal Languages.

CONTENTS

UNIT -I

Introduction – phrase structure languages.

UNIT-II

Closure operations.

UNIT-III

Context free languages.

UNIT-IV

Finite state automata.

UNIT-V

Push down automata.

TEXT BOOK:

1. *Rani Sriomoney. 1984.* **Formal Languages and Automata.** Christian Literary Society, Madras. Chapters 1 to 6.

   UNIT - I : Chapter 1 and2

   UNIT - II : Chapter 3

   UNIT - III: Chapter 4

   UNIT - IV: Chapter 5

   UNIT - V : Chapter 6

REFERENCE BOOKS:

1. *Hopcrot and still man.* 1990. **Formal languages and their relation automata.** Addision Wesley.
2. *Kulin, R.Y.* 2000. **Automata theory-Machines and Languages.** McGraw Hill.

17UMT6EB	ELECTIVE - II - ASTRONOMY – II	SEMESTER– VI

PREAMBLE:

1. On successful completion of this course the students should gain knowledge about Astronomy.
2. To know about the concept of Planetory.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about the equation and conversion of time	K1
CO 2	Learn about the Abberation	K1
CO 3	Learn about the Precession and nutation	K2
CO 4	Learn about the Eclipses	K2
CO 5	Learn about the Planetory Phenomenon	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	M	S	S	M
CO 2	S	S	S	S	M
CO 3	S	M	S	S	S
CO 4	S	S	M	S	S
CO 5	S	S	S	S	S

S- Strong; M-Medium; L-Low

17UMT6EB	ELECTIVE - II - ASTRONOMY – II	SEMESTER– VI

Credits: 4
Hours Per Week: 5

CONTENTS

UNIT - I

Time: Equation of time – Conversion of time – Seasons – Calendar.

UNIT - II

Annual Parallax – Abberation.

UNIT - III

Precession – Nutation.

UNIT - IV

The Moon – Eclipses.

UNIT - V

Planetory Phenomenon – The Stellar system.

TEXT BOOK:

1. *Kumaravelu, S and Susheela Kumaravelu*. 2007. **Astronomy.** S. Chand & Sons Publications.New Delhi.

17UMT6EC	ELECTIVE-II: HISTORY OF MATHEMATICS II	SEMESTER – VI

PREAMBLE:

1. To enable students gain fundamental knowledge about Mathematics and Mathematicians.
2. To know about the various basic concepts in Mathematics.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Astronomy	**K1**
CO2	To understand the Theory of Numbers	**K1**
CO3	To gain knowledge about the British Techniques and Continental Methods	**K2**
CO4	Apply the Mathematical Physics in Germany	**K2**
CO5	Apply the Mathematics in Italy	**K2**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	S	M	S	S	M
CO3	S	M	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S-Strong; M-Medium; L-Low

17UMT6EC	ELECTIVE-II: HISTORY OF MATHEMATICS II	SEMESTER – VI

Credits: 4
Hours Per Week: 5

CONTENTS

UNIT - I

Early Modern Problem Solvers: Accessibility of Computation - Decimal Fractions - Notation - Logarithms - Mathematical Instruments - Infinitesimal Methods: Stevin - Johannes Kepler.

Analysis - Synthesis - the Infinite and Numbers: Galileo's Two New Sciences - Bonaventura Cavalieri - Evangelista Torricelli - Mersenne's Communicants - Rene´ Descartes - Fermat's Loci - Gregory of St. Vincent - The Theory of Numbers - Gilles Persone de Roberval - Girard Desargues and Projective Geometry - Blaise Pascal - Philippe de Lahire - Georg Mohr - Pietro Mengoli - Frans van Schooten - Jan de Witt - Johann Hudde - Rene´ Franc¸ois de Sluse - Christiaan Huygens.

UNIT - II

British Techniques and Continental Methods: John Wallis - James Gregory - Nicolaus Mercator and William Brouncker - Barrow's Method of Tangents - Newton - Abraham De Moivre - Roger Cotes - James Stirling - Colin Maclaurin - Textbooks - Rigor and Progress - Leibniz - The Bernoulli Family - Tschirnhaus Transformations - Solid Analytic Geometry - Michel Rolle and Pierre Varignon - The Clairauts - Mathematics in Italy - The Parallel
Postulate - Divergent Series.

UNIT - III

Euler: The Life of Euler - Notation - Foundation of Analysis - Logarithms and the Euler Identities - Differential Equations - Probability - The Theory of Numbers - Textbooks - Analytic Geometry - The Parallel Postulate: Lambert - **Pre to Postrevolutionary France**: Men and Institutions - The Committee on Weights and Measures - D'Alembert - Be´zout - Condorcet - Lagrange - Monge - Carnot - Laplace - Legendre - Aspects of Abstraction - Paris in the 1820s - Fourier - Cauchy - Diffusion.

UNIT - IV

Gauss: Nineteenth-Century Overview - Gauss: Early Work - Number Theory - Reception of the Disquisitiones Arithmeticae - Astronomy - Gauss's Middle Years - Differential Geometry - Gauss's Later Work - Gauss's Influence.**Geometry:** The School of Monge - Projective Geometry: Poncelet and Chasles - Synthetic Metric Geometry: Steiner - Synthetic Nonmetric Geometry: von Staudt - Analytic Geometry - Non-Euclidean Geometry - Riemannian Geometry - Spaces of Higher Dimensions - Felix Klein - Post-Riemannian Algebraic Geometry.

UNIT - V

Algebra: Introduction - British Algebra and the Operational Calculus of Functions - Boole and the Algebra of Logic - Augustus De Morgan - William Rowan Hamilton - Grassmann and Ausdehnungslehre - Cayley and Sylvester - Linear Associative Algebras - Algebraic Geometry - Algebraic and Arithmetic Integers - Axioms of Arithmetic. **Analysis:** Berlin and Go¨ttingen at Midcentury - Riemann in Go¨ttingen - Mathematical Physics in Germany - Mathematical Physics in English-

Speaking Countries - Weierstrass and Students - The Arithmetization of Analysis - Dedekind - Cantor and Kronecker - Analysis in France.

TEXT BOOK:

1. *Uta C.Merzbach and Carl B. Boyer*. 2010. **A History of Mathematics**. Third Edition. John Wiley & Sons. Inc.

   Unit - I : Chapters 14 and 15

   Unit - II : Chapter 16

   Unit – III : Chapters 17 and 18

   Unit - IV : Chapters 19 and 20

   Unit – V : Chapters 21 and 22

REFERENCE BOOK:

1. *David M. Burton*. 2011. **The History of Mathematics an Introduction**. Seventh Edition. University of New Hampshire. McGraw-Hill.

17UMT6ED	ELECTIVE III: NUMBER THEORY	SEMESTER–VI

PREAMBLE:

1. To give an insight into numbers.
2. To understand the concept of Number-Theoretic Functions

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	Know the concept of divisibility , G.C.D etc.	**K1**
CO2	Know the basic properties of congruences, Binary and decimal representation of integers.	**K1**
CO3	Solve problems of greatest integer function.	**K2**
CO4	Solve n- primitive roots for Primes , Composite numbers having primitive roots.	**K3**
CO5	Know the concept of Legendre symbol and its properties	**K3**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	M	S	S	M
CO3	S	M	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S-Strong; M-Medium; L-Low

17UMT6ED	ELECTIVE III: NUMBER THEORY	SEMESTER –VI

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Premilinaries: Mathematical Induction-The Binomial Theorem.

Divisibility Theory in the Integers: The Division Algorithm-The Greatest Common Divisor-The Euclidean Algorithm-The Diophantine Equation $ax+by=c$.

UNIT - II

Primes And Their Distribution: The fundamental Theorems of Arithmetic – Goldbach Conjecture.

The Theroy Of Congruences: Basic properties of Congruence-Binary and Decimal Representations of integers-Linear Congruences and the Chinese Remainder Theorem.

UNIT - III

Fermat's Theorem: Fermat's Little Theorem and Pseudoprimes-Wilson's Theorem.

Number-Theoretic Functions: The sum and Number of Divisors-The Mobius Inversion Formula-The Greatest Integer Function.

UNIT - IV

Euler's Generalization Of Fermat's Theorem: Euler's Phi-Function-Euler's Theorem-Some properties of the Phi Function.

Primitive Roots And Indices: The Order of an Integer modulo n-Primitive Roots for Primes-Composite Numbers having Primitive Roots.

UNIT - V

The Quadratic Reciprocity law: Euler's Criterion-The Legendre Symbol and its Properties-Quadratic Reciprocity-Quadratic Congruences with Composite Moduli.

TEXT BOOK:

1. *David M.Burton.* 2010. **Elementary Number Theory** (Sixth Edition).Tata McGraw Hill.

UNIT - I : Chapter 1and 2 (sec 1.1-1.2 and 2.2-2.5).

UNIT - II : Chapter 3 and 4 (sec 3.1,3.3 and 4.2-4.4)

UNIT – III : Chapter 5 and 6 (sec 5.2-5.3 and 6.1-6.3)

UNIT – IV : Chapter 7 and 8 (sec 7.2- 7.4 and 8.1-8.3)

UNIT - V : Chapter 9 (sec 9.1-9.4)

REFERENCE BOOKS:

1. *Ivan Nivan and Herberts Zucherman*.1991. **An Introduction to Theory of Numbers**. Fifth Edition, Wiley Eastern Limited, New Delhi.
2. *Kennath and Rosan.* 1992.**Elementary Number Theory and its Applications.** Addison Wesley Publishing Company

17UMT6EE	ELECTIVE III: SPECIAL FUNCTIONS AND INTEGRAL TRANSFORMS	SEMESTER – VI

PREAMBLE:

1. On successful completion of this course the students should gain knowledge about Bessel's equation, Hermite equation and Legendre's equation.
2. To know about Laplace transform and Fourier transforms.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about Bessel's function & Gamma and Beta functions	K1
CO 2	Understand the Hermite equation and its solution	K2
CO 3	Learn about Legendre function	K2
CO 4	Learn about Differentiation and integration of Laplace transform	K2
CO 5	Learn about Relations between Fourier transform and Laplace transform	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	M	S	S
CO 2	S	S	S	S	M
CO 3	S	S	S	S	S
CO 4	S	S	S	S	S
CO 5	S	S	M	S	S

S- Strong; M-Medium; L-Low

17UMT6EE	ELECTIVE III: SPECIAL FUNCTIONS AND INTEGRAL TRANSFORMS	SEMESTER – VI

Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Bessel's equation and its solution - Bessel's function of the first kind of order n - important results of Gamma and Beta functions – relation between $J_n(x)$ and $J_{-n}(x)$,n being an integer- Bessel's function of the second kind of order n – integration of Bessel equation in series for n=0 Bessel's function of zeroth order – recurrence relations for $J_n(x)$ and generating functions, Orthogonality of Bessel functions.

UNIT – II

Hermite equation and its solution – Hermite polynomial of order n – generating function for Hermite polynomials – hermite polynomials for some special values of n – Evaluation of values of $H_{2n}(0)$ and $H_{2n+1}(0)$ – Orthogonal properties of the Hermite polynomials – recurrence relations.

UNIT – III

Legendre's equation and its solution – Legendre function of the first kind – generating function for Legendre polynomials – Trigonometry series for $P_n(x)$ – Laplace definite integrals for $P_n(x)$ – Orthogonal properties of Legendre polynomials – recurrence relations – Legendre series for f(x)- expansion of f(x) in a series of Legendre polynomials- expansion of x^n in Legendre polynomials.

UNIT - IV

Laplace Transforms – Existence theorem for Laplace transforms-Linearity of the Laplace transforms-Shifting theorems- Laplace transforms of derivatives and integrals- Differentiation and integration of Laplace transforms- Convolution theorem.

UNIT – V

Fourier transforms: Fourier Sine transform-Fourier cosine transform-Relations between Fourier transform and Laplace transform -Linearity property- Shifting-Modulation- Convolution Theorem- - Parseval's identity for Fourier transforms- Fourier Transform of Derivatives-solution of differential Equations using Fourier Transforms.

TEXT BOOKS:

1.*Raisinghania.M.D.* 2014. **Ordinary and Partial Differential Equations**. S. Chand and company Pvt. Ltd.

Unit - I : Chapter 11(Sec 11.1-11.6,11.7-11.8,11.10)

Unit - II : Chapter 12 (Sec 12.1-12.3,12.5-12.7)

Unit - III : Chapter 9 (Sec 9.1-9.3,9.5,9.6,9.8,9.9,9.16,9.20)

2. *Raisinghania. M.D , Saxena.H.C, Dass.H.K.* 2003. **Integral Transforms.** S.Chand and company Pvt. Ltd.

Unit - IV : Chapter 3

Unit - V : Chapter 4

REFERENCE BOOKS:

1.*Sneddon, I.N.* 1974. **The Use of Integral Transforms.** Tata Mc Graw Hill, New Delhi.

2.*Vittal .P.R.* 2012. **Differential equations , Fourier and Laplace Transforms, Probability** , Margham Publications , Chennai.

17UMT6EF	ELECTIVE III: GRAPH THEORY	SEMESTER – VI

PREAMBLE:

1. To translate real life situations to diagrammatic representations.
2. To develop problem solving skills and there by solve real life problems.

COURSE OUTCOMES:

On the successful completion of the course, student will be able to

CO Number	CO Statement	Knowledge Level
CO 1	Learn about graphical representation and travelling sales man problem	K1
CO 2	Understand the concept of circuits	K2
CO 3	Find the concept of isomorphism and planarity	K2
CO 4	Apply matrix representation of graphs	K3
CO 5	Application of coloring	K3

Mapping with Programme Outcomes

COS/POS	PO 1	PO 2	PO 3	PO 4	PO 5
CO 1	S	S	M	S	S
CO 2	S	S	S	S	M
CO 3	S	S	S	S	S
CO 4	S	S	S	S	S
CO 5	S	S	M	S	S

S- Strong; M-Medium; L-Low

17UMT6EF	ELECTIVE III: GRAPH THEORY	SEMESTER – VI

Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Graph- Application of Graphs-Finite and Infinite Graphs – Incidence and Degree- Isolated Vertex,Pendent Vertex and Null graph- Brief History of Graph Theory.

Paths and circuits: Isomorphism- Subgraphs – A Puzzle With Multicolored Cubes – Walks,Paths, and Circuits - Connected Graphs, Disconnected Graphs -Euler Graphs- Operations On Graphs – More on Euler Graphs - Hamiltonian Paths and Circuits – The Traveling Salesman Problem.

UNIT - II

Trees- Some Properties of Trees–pendent Vertices in a tree- Distance and Centers in a Tree - Rooted and Binary Trees- On Counting Trees - Spanning Trees-Fundamental Circuits- Finding All Spanning Trees of a Graph –Spanning Trees in a Weighted Graph.

UNIT - III

Cut- Sets and Cut- Vertices : Cut- Sets - Some Properties of a Cut- Set - All Cut- Sets in a graph- Fundamental Circuits and Cut-sets-Connectivity and Separability – Network Flows - 1-Isomorphism - 2-Isomorphism . Planar and Dual Graphs: Combinatorial Vs. Geometric Graphs - Planar Graphs- Kuratowski's Two Graphs – Different representation of a Planar Graphs – Detection of Planarity – Geometric Dual – Combinatorial Dual – More on Criteria of Planarity –Thickness and Crossings.

UNIT - IV

Matrix representation of graphs: Incidence matrix- Sub matrices of A(G)- Circuit Matrix – Fundamental Circuit Matrix and Rank of B – An Application of Switching Network – Cut-Set Matrix – Relationship among A_f, B_f and C_f - Path Matrix- Adjacency Matrix. Directed graphs: Directed graph –Some Types of Digraphs –Digraphs and Binary Relations - Directed Paths and Connectedness- Euler Digraphs-Trees with Directed Edges- Fundamental Circuits in Digraphs- Matrices A,B and C of Diagraphs - Adjacency Matrices of a Diagraph – Paired Comparisons and Tournaments- Acyclic Digraphs and Decyclization .

UNIT - V

Coloring ,Covering and Partitioning :Chromatic Number-Chromatic Partitioning-Chromatic Polynomial- Matchings - Coverings-The Four Color Problem-Graph Theory in Operations Research : Transport Networks-Extensions of Max-Flow Min-Cut Theorem – Minimal Cost Flows – The Multi Commodity Flow – Further Applications – More on Flow Problems - Activity Networks in Project Planning –Analysis of an Activity Network – Further Comments on Activity Networks - Graphs in Game Theory.

TEXT BOOK:

1. Narsingh Deo .1999.**Graph Theory with Applications to Engineering and Computer Science** ,Prentice Hall. New Delhi.

   Unit - I : Chapter 1 and Chapter 2

   Unit - II : Chapter 3

   Unit - III : Chapter 4 and 5

   Unit - IV : Chapter 7 and Chapter 9

   Unit - V : Chapter 8 and Chapter 14

REFERENCE BOOKS:

1. *Arumugam S and Ramachandran S* . 1999. **Invitation to Graph Theory** by *SCITECH* Publications.
2. *Harary*. 2004. **Graph Theory** . Narosa Publishing House Pvt. Ltd.New Delhi.

17UMTSS1	SELF STUDY PAPER – I VEDIC MATHS - I	Semester III

PREAMBLE:

1 To enhance student knowledge in Vedic Mathematics

2 To enhance student knowledge in Simple techniques to solve the problems.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Vedic method	**K1**
CO2	Verification of the product of two numbers	**K2**
CO3	Apply the Divisibility Test of numbers by 11	**K3**
CO4	Apply the Secondary Bases of 50	**K3**
CO5	Solve the problems related 2-Digit Multiplication	**K2**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	S	S	S
CO3	S	S	S	M	S
CO4	S	S	M	S	S
CO5	M	S	S	S	S

S-Strong; M-Medium; L-Low

17UMTSS1	SELF STUDY PAPER – I VEDIC MATHS - I	Semester III

Credit: 1

CONTENTS

UNIT - I

Simple techniques :

Subtraction from 100/1000/10000 - Normal method - Vedic method - Multiplication with a series of 9s.

UNIT - II

Remainder on dividing a number by 9

Basic method - First enhancement - Second enhancement – Verification of the product of two numbers, sum of two numbers.

UNIT - III

Operations with 11

Multiplication – Divisibility Test of numbers by 11– Multiplication with 11

UNIT – IV

Multiplication (Nikhilam)

Secondary Bases of 50 – Secondary Bases of 500

UNIT – V

(Multiplication (Urdha Tiryak)

2-Digit Multiplication - 3-Digit Multiplication

TEXT BOOK:

Atul Cupta, The Power of Vedic Maths, 2005, Jaico Publishing House Mumbai.

17UMTSS2	SELF STUDY PAPER – II VEDIC MATHS - II	Semester III

PREAMBLE:

1 To enhance student knowledge in Vedic Mathematics

2 To enhance student knowledge in Simple techniques to solve the problems.

COURSE OUTCOMES:

On the successful completion of the course, the student will be able to

CO Number	CO Statement	Knowledge Level
CO1	To Learn about the Division by a flag of one digit	**K1**
CO2	To Learn about the Numbers ending with 5	**K1**
CO3	Apply the Duplex numbers	**K3**
CO4	Computing cubes of 2 digits numbers	**K3**
CO5	Solve the problems related Division by a flag of one digit	**K2**

Mapping with Program Outcomes:

CO's/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	S	S	M	S
CO3	S	M	S	S	S
CO4	S	S	M	S	S
CO5	M	S	S	S	S

S-Strong; M-Medium; L-Low

17UMTSS2	SELF STUDY PAPER – II VEDIC MATHS - II	Semester III

Credit:1

CONTENTS

UNIT – I

Division :

Division by a flag of one digit (no remainder) - Division by a flag of one digit (with remainder).

UNIT - II

Simple Squares :

Numbers ending with 5 – Two numbers starting with same digit and ending digits adding upto 10

UNIT – III

Square of any number :

Definition – Dwandwa or Duplex – Square of any Number

UNIT – IV

Square root of a number - Steps – Perfect square root

UNIT – V

Cubes and Cube Roots :

Computing cubes of 2 digits numbers – Cube roots of 2 digit numbers

TEXT BOOK:

Atul Cupta, The Power of Vedic Maths, 2005, Jaico Publishing House Mumbai.

BoS Chairman/HoD
Department of Mathematics
Dr. N. G. P. Arts and Science College
Coimbatore – 641 048

Dr. P.R. MUTHUSWAMY
PRINCIPAL
Dr. NGP Arts and Science College
Dr. NGP - Kalapatti Road
Coimbatore - 641 048
Tamilnadu, India