BACHELOR OF SCIENCE
MATHEMATICS
WITH COMPUTER APPLICATIONS

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 WITH COMPUTER APPLICATIONS REGULATIONS

ELIGIBILITY

A Candidate for admission to the first year of the **B. Sc. Mathematics with Computer Applications** Degree Programme shall be required to have passed the higher secondary examination conducted by the Govt. of Tamil Nadu with Mathematics as one of the paper are only eligible or other examinations accepted as equivalent there to by the Academic Council, subject to such other conditions as may be prescribed therefore. Business Mathematics, General Mathematics and Statistics subject at HSC shall not be considered as equivalent to Mathematics.

PROGRAMME EDUCATIONAL OBJECTIVES

1. To understand the basic rules of logic, including the role of axioms or assumptions
2. To Appreciate the role of mathematical proof in formal deductive reasoning
3. To Proficiently construct logical arguments and rigorous proofs
4. To Formulate and solve abstract mathematical problems
5. To Recognize real-world problems that are amenable to mathematical analysis, and formulate mathematical models of such problems
6. To Apply mathematical methodologies to open-ended real-world problems

SCHEME OF EXAMINATION

Course Code	Course	Hrs of Instruction	Exam Duration (Hrs)	Max Marks			Credit Points
				CA	CE	Total	
First Semester							
Part – I							
17UTL11U 17UHL11H 17UML11M 17UFL11F	Tamil-I Hindi-I/ Malayalam-I/ French – I	5	3	25	75	100	3
Part – II							
17UEG12F	English - I	5	3	25	75	100	3
Part – III							
17UMA13A	Core –I: Classical Algebra	6	3	25	75	100	4
17UMA13B	Core -II: Calculus	6	3	25	75	100	4
17UMA1AA	Allied -I: Statistics – I	6	3	25	75	100	4
Part – IV							
17UFC1FA	Environmental studies	2	2	-	50	50	2
		30				**550**	**20**
Second Semester							
Part – I							
17UTL21U 17UHL21H 17UML21M 17UFL21F	Tamil-II/ Hindi-II/ Malayalam-II/ French – II	5	3	25	75	100	3
Part – II							

BoS Chairman/HoD
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Dr. N. G. P. Arts and Science College
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17UEG22F	English - II	5	3	25	75	100	3
Part – III							
17UMA23A	Core -III: Analytical Geometry	6	3	25	75	100	4
17UMA23B	Core -IV: MS Office	2	2	-	50	50	2
17UMA23P	Core Lab - I : MS Office	4	3	20	30	50	2
17UMA2AA	Allied- II: Statistics – II	6	3	25	75	100	4
Part – IV							
17UFC2FA	Value Education: Human Rights	2	2	-	50	50	2
		30				**550**	**20**
Third Semester							
Part – III							
17UMA33A	Core -V: Trigonometry, Vector Calculus and Fourier Series	5	3	25	75	100	4
17UMA33B	Core -VI : Mechanics	5	3	25	75	100	3
17UMA33C	Core -VII: Operations Research-I	3	3	25	75	100	3
17UMA33P	Core Lab – II: RDBMS & Oracle	4	3	20	30	50	2
17UCI3AB	Allied - III : Business Accounting - I	5	3	25	75	100	4
17UMA3SA	Skill Based Subject –I : Quantitative	4	2	-	50	50	4

	Aptitude – I						
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				**600**	**24**
Fourth Semester							
Part – III							
17UMA43A	Core -VIII: Differential Equations and Laplace Transforms	4	3	25	75	100	4
17UMA43B	Core -IX: Number Theory	4	3	25	75	100	3
17UMA43C	Core -X: Operations Research-II	3	3	25	75	100	3
17UMA43D	Core- XI: Programming in C & C++	2	2	-	50	50	2
17UMA43P	Core Lab – III: Programming in C & C++	4	3	20	30	50	2
17UCI4AB	Allied - IV : Business Accounting - II	5	3	25	75	100	4
17UMA4SA	Skill Based	4	2	-	50	50	4

	Subject-II : Quantitative Aptitude – II						
Part – IV							
	NMEC-II:	2	2	-	50	50	2
17UFC4FA/ 17UFC4FB/ 17UFC4FC/	Tamil / Advanced Tamil (or)General Awareness	2	2	-	50	50	2
		30				**650**	**26**
Fifth Semester							
Part – III							
17UMA53A	Core- XII: Real Analysis I	5	3	25	75	100	5
17UMA53B	Core -XIII: Complex Analysis I	5	3	25	75	100	5
17UMA53C	Core -XIV: Modern Algebra	5	3	25	75	100	4
17UMA53D	Core- XV: Fundamentals of Data Science and R Programming	2	2	-	50	50	2
17UMA53P	Core Lab – IV: R Programming	4	3	20	30	50	2
	Elective – I	5	3	25	75	100	4
17UMA5SP	Skill based subject- III: LATEX	4	3	20	30	50	2
		30				**550**	**24**
Sixth Semester							

Part – III							
17UMA63A	Core- XVI: Real Analysis II	5	3	25	75	100	5
17UMA63B	Core- XVII: Complex Analysis II	5	3	25	75	100	5
17UMA63C	Core -XVIII: Java Programming	2	2	-	50	50	2
17UMA63P	Core Lab - V: Java Programming	4	3	20	30	50	2
	Elective -II :	5	3	25	75	100	4
	Elective -III :	5	3	25	75	100	4
17UMA6SP	Skill based subject –IV: Advanced Excel	4	3	20	30	50	2
Part - V							
17UEX65A	Extension Activity	-	-	-	50	50	2
		30				**600**	**26**
					Grand Total	**3500**	**140**

ELECTIVE – I

(Student shall select any one of the following Course as Elective in fifth semester)

S.No	Course Code	Name of the Course
1	17UMA5EA	Astronomy-I
2	17UMA5EB	Numerical Methods-I
3	17UMA5EC	Discrete Mathematics

ELECTIVE – II

(Students shall select any one of the following Course as Elective in sixth semester)

S.No	Course Code	Name of the Course
1.	17UMA6EA	Astronomy-II
2.	17UMA6EB	Numerical Methods-II
3.	17UMA6EC	Digital Electronics and Computer Fundamentals

ELECTIVE - III

(Students shall select any one of the following Course as Elective in sixth semester)

S.No	Course Code	Name of the Course
1.	17UMA6ED	Automata Theory & Formal Languages
2.	17UMA6EE	Fuzzy Logic and Neural Networks
3.	17UMA6EF	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 subject as Non Major Elective Courses during their III and IV semester

S.No	Semester	Course Code	Name of the Course
1.	III	17UNM34B	Mathematics for Competitive Examinations-I
2.	IV	17UNM44B	Mathematics for Competitive Examinations-II

FOR PROGRAMME COMPLETION

Students have to complete the following Courses:

- Language papers (Tamil/Malayalam/French/Hindi, English) in I and II 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

Part	Course	Papers	Credit	Total credits	Papers
1	BEC/ Self study courses	1 paper	1	**1**	**1**
2	Hindi / French/ Other foreign Language approved by certified Institutions	1 Course	1	**1**	**-**
3	Type Writing / Short Hand Course	1 Course	1	**1**	**-**
4	Diploma/certificate/CPT /ACS Foundation/ NPTEL Course	1 Course	1	**1**	**-**
5	Representation – Academic/Sports /Social Activities/ Extra Curricular / Co-Curricular activities at University/ District/ State/ National/ International	1	1	**1**	
Total		4		**5**	**1**

Rules:

The students can earn extra credit only if they complete the above during the Programme 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 Programme 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 Programme period before fifth semester (I semester to V semester).

Self study paper offered by the Mathematics with Computer Applications Department

S. No.	Semester	Course Code	Course Title
1.	III semester	17UMASS1	Vedic Mathematics
2.		17UMASS2	History of Mathematics

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 Programme period (**first to fifth 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 Programme 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 Programme 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.

Total Credit Distribution

Course	Credits	Total		Credits	Cumulative Total
Part I: Tamil	3	2x 100	200	06	12
Part II: English	3	2x 100	200	06	
Part III:					
Core	5	4 x 100	400	20	114
Core	4	6 x 100	600	24	
Core	3	4x 100	400	12	
Core	2	4 x50	200	08	
Core Lab	2	5x 50	250	10	
Elective	4	3 x 100	300	12	
Allied Theory	4	4 x 100	400	16	
Skill Based Subject Theory	4	2 x 50	100	08	
Skill Based Subject Lab	2	2 x 50	100	04	
Part IV:					
Value Education	2	1 x 50	50	02	12
Environmental Studies	2	1 x 50	50	02	
Foundation Course	2	2 x 50	100	04	
NMEC	2	2 x 50	100	04	
Part V:					
Extension Activity	2	1 x50	50	02	02
Total			**3500**	**140**	**140**

PROGRAMME OUTCOMES

PO Number	PO Statement
PO1	To maintain a core of Mathematical and Computational knowledge that provides a solid foundation for future learning
PO2	To develop a respectable intellectual level seeking to expose the various concepts in Mathematics and Computer Applications
PO3	To enhance the students reasoning, logical, problem solving, employability skills for carrier opportunities
PO4	To promote the interest among students in higher studies and inter disciplinary research
PO5	To develop an advance level of career prospectus in a huge array of fields in mathematics and its applications.

17UMA13A	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

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn sequences and series, Binomial theorem, Exponential series and Logarithmic series	**K1**
CO 2	Learn the Convergence or Divergence of sequences and series comparison tests- Cauchy's condensation test, De Alembert's ratio test, Cauchy's roots test, Raabe's test	**K1**
CO 3	Distinguish the Convergence / Divergence of series	**K2**
CO 4	Distinguish the various tests in testing, studying the convergence/ divergence of rules.	**K2**
CO 5	Solve the problems in theory of equations and Convergence / Divergence of series	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	M	M
CO4	S	S	M	M	M
CO5	S	S	M	M	M

S-Strong; M-Medium; L-Low

17UMA13A	CORE – I : CLASSICAL ALGEBRA	SEMESTER – I

Total Credits:4
Hours Per Week:6

CONTENTS

UNIT - I

BINOMIAL THEOREM: Binomial theorem for a positive integral index – Multinomial theorem (Expansion of the product $(a+b+c+d+\cdots)^n$) - Vandermonde's Theorem- Application of the Binomial Theorem to the summation of series.

UNIT - II

EXPONENTIAL AND LOGARITHMIC SERIES: The Exponential limit - The exponential theorem-Summation of Exponential series - The logarithmic series (Theorem) - Modification of the logarithmic series - Euler's constant – Summation of logarithmic series.

UNIT - III

CONVERGENCY AND DIVERGENCY OF SERIES: General theorems – series of positive terms - comparison tests- Cauchy's condensation test- De Alembert's ratio list –Cauchy's roots test - Raabe's test.

UNIT - IV

THEORY OF EQUATIONS : Roots of an equation- Equation with real coefficient imaginary roots occurs in pairs – Equation with rational coefficients irrational roots occur in pair – Relation between the roots and coefficient of equation - Transformations of equations - Reciprocal equations.

UNIT – V

THEORY OF EQUATIONS : Descarte's rule of signs - Rolle's theorem – Multiple root – Strum's theorem – solution of numerical equations - Horner's method.

TEXT BOOK

1. *Manicavachasam Pillai, T.K. Natarajan,T. and Ganapathy,K.S*. 2015. **Algebra- VOLUME I.** S. Viswanatham Printers & Publishers Private Ltd.

   UNIT I : Chapter 3 :Pg.no 99 – 124, 143 - 152

   UNIT II : Chapter 4 :Pg.no 191 – 207, 213 - 230

   UNIT III : Chapter 2 :Pg.no 43 – 83

   UNIT IV : Chapter 6 : Pg.no 282 – 303, 318 - 337

   UNIT V : Chapter 6 : Pg.no 351 – 365, 376 - 381

REFERENCE BOOKS

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

17UMA13B	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, its geometrical application, proper and improper integration.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Recall differentiation, integration and properties of definite integral.	K1
CO 2	Learn partial differentiation, circle, radius and centre of curvature, Gamma and Beta Function.	K1
CO 3	Distinguish integrations of various forms of functions.	K2
CO 4	Compute radius of curvature in polar co-ordinates, Involute , Evolute and double integrals.	K3
CO 5	Solve the problems in pedal equations, triple integrals, Gamma, Beta function and Application of Gamma function to multiple integrals.	K3

Mapping with Programme outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	M	M
CO4	S	S	M	M	M
CO5	S	S	M	M	M

S-Strong; M-Medium; L-Low

17UMA13B	CORE – II : CALCULUS	SEMESTER - I

Total Credits:4
Hours Per Week:6

CONTENTS

UNIT - I

Curvature: 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 - II

Partial Differentiation: Successive partial derivatives – Function of function rule – Total differential coefficient- Special case – Implicit functions – Homogeneous functions – Euler's theorem- Partial derivatives of a function of two functions.

UNIT – III

Integration: Integration of $f'(x)/f(x)$, $F\{f(x)\}f'(x)$, $(px+q)/\sqrt{ax^2+bx+c}$ – (x-a)(b-x), $1/\sqrt{(x-a)(b-x)}$, $1/(acosx+bsinx+c)$, $1/(a^2cos^2x+b^2sin^2x+c)$ - Integration by parts

UNIT –IV

Multiple integrals: Evaluation of the double integral – Double integral in polar co-ordinates- Triple integral- Applications to calculations of areas and volumes.

UNIT – V

Beta and Gamma functions : 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 Manicavachasam Pillai, T.K*. 2015. **Calculus volume I.** S.Viswanathan Publishers, Chennai.
   UNIT-I : Chapter X : Section 2.1-2.8
   UNIT-II : Chapter VIII : Section 1.1 to 1.6
2. *Narayanan,S and Manicavachasam Pillai, T.K*. 2009. **Calculus volume II.** S.Viswanathan Publishers, Chennai.
   UNIT-III : Chapter 1: Page No.16-17; 20-21; 43-45; 57-58; 63-65.
   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 B.Sc – Volume I and II.** S.Chand and Company.
2. *Shanthi Narayanan and Kapoor,J.N*. 2003. **A Text book of Calculus.**S.Chand& Co.

17UMA1AA	ALLIED – I : STATISTICS - I	SEMESTER - I

PREAMBLE

1. On successful completion of this course the students should understood the concepts of Probability and Random variable.
2. Should understand the concept of Correlation and Regression analysis

COURSE OUTCOMES

In 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	Interpret the Mathematical Expectation	**K2**
CO 4	Interrelate Correlation and Regression Analysis	**K2**
CO 5	Solve the problems in Correlation and Regression Analysis, Moments, Conditional Probability	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	M	M	M
CO4	S	S	S	S	S
CO5	S	S	M	M	M

S-Strong; M-Medium; L-Low

17UMA1AA	ALLIED – I : STATISTICS - I	SEMESTER - I

Total Credits:4
Hours Per Week:6

CONTENTS

UNIT –I

Theory of Probability-I : Introduction –Short History- Basic Terminology- Mathematical Probability- Statistical probability- Subjective Probability- Mathematical Tools- Axiomatic Approach to Probability- Some Theorems on Probability- Conditional Probability-Multiplication Theorem on Probability- Independents Events.

UNIT –II

Random Variables and Distribution Functions: Introduction - Distribution Function- Discrete Random Variable- Continuous Random Variable - Two Dimensional Random Variable

UNIT –III

Mathematical Expectation: Introduction- Expected Value of a Random Variable- Expected Value of function of a Random Variable- Properties of Expectation- Properties of Variance – Covariance - Moments of Bivariate Probability Distributions-Conditional Expectation and Conditional Variance.

UNIT –IV

Generating Functions and Law of Large Numbers: Moment Generating Functions - Cumulants –Characteristic Functions – Some important theorems- Chebychev's Inequality - Weak law of Large Numbers.

UNIT –V

Correlation : Introduction – Meaning of Correlation- Scatter Diagram- Karl Pearson's Coefficient of Correlation- Rank Correlation. **Linear and Curvilinear Regression:** Introduction - Linear Regression- Curvilinear Regression

TEXT BOOKS:

1. Gupta. S.C and V.K.Kapoor. 2007. **Fundamentals of Mathematical Statistics**, Sultan **C**hand & Sons, New Delhi.
   Unit -I : Chapter 3: Section 3.1 – 3.12
   Unit -II : Chapter 5: Section 5.1 - 5.5
   Unit -III : Chapter 6: Section 6.1 – 6.6, 6.8 & 6.9
   Unit -IV : Chapter 7: Section 7.1-7.5 & 7.7
   Unit -V : Chapter 10: Section 10.1-10.4 & 10.7
   Chapter 11: Section 11.1-11.3

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. Vittal,B.R. 2015. **Mathematical Statistics**, Margham Publication, Chennai.

17UMA23A	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

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the concepts and equations of a plane, line, sphere, cone, cylinder and conicoid.	K1
CO 2	Interpret the plane section of a sphere, explain the right circular cone, right circular cylinder.	K2
CO 3	Illustrate the SD between the two lines and co-planar lines	K2
CO 4	Solve the problems in sphere, cone, cylinder, conicoid, symmetric form of straight line	K3
CO 5	Apply the tangent plane, normal to solve the problems in sphere, cone, cylinder and conicoid	K3

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	M	M	M
CO4	S	S	M	M	M
CO5	S	S	M	M	M

S-Strong; M-Medium; L-Low

17UMA23A	CORE – III : ANALYTICAL GEOMETRY	SEMESTER - II

Total Credits:4
Hours Per Week:6

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

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 – Simple problems

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 : 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

UNIT – V

Cylinder : Right circular 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.

TEXT BOOK

1. *ManicavachagomPillay T.K. and Natarajan T*. 2011. **Analytical Geometry (Three Dimensions)**. S.Viswanathanpublishers .

   UNIT I :Chapter –II:1,2,3,4,5,6,7,8,9

   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

REFERENCE BOOK

1. *DuraiPandian, P. Laxmiduraipandian and Mukilan,D*.2003.**Analytical Geometry 3D.**S.Chand and Company.

17UMA23B	CORE – IV: MS OFFICE	SEMESTER - II

PREAMBLE

1. To enable students gain fundamental knowledge about Microsoft office and its applications.
2. To know about the Excel, Power point and Access tools.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1.	Demonstrate the basic knowledge of MS – Word, Excel, Power point and Access.	**K1**
CO2.	Perform working knowledge of using Word's advance formatting techniques and uses of accepted business style formatting conventions.	**K2**
CO3.	Recognize how to secure information's, working knowledge of organizing, use of formulas and complex data in MS -Excel.	**K2**
CO4.	Apply in business, finance and IT to create and work with database and reduce data redundancy in MS- Access.	**K3**
CO5.	Develop working knowledge of integrating information from other MS programming into Power point presentation, effective way to convey message and presentation style.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	M	M	M
CO5	S	S	M	M	M

S-Strong : M-Medium : L-Low

17UMA23B	CORE – IV: MS OFFICE	SEMESTER - II

Total Credits:2
Hours Per Week:2

CONTENTS

UNIT – I

Introducing Office 2010: Microsoft Office 2010- Ribbon Technology- installing Office 2010- start an application- save the document- quick Access toolbar – Office document type-file extensions- convert to office 2010- save to web.

UNIT – II

Create Word documents: Create word document – Enter text – select and copy text – correct proofing error- apply styles- insert a picture- page layout- word count- create a table- convert text to table – print document

UNIT – III

Complex document: Start a booklet- choose page arrangement- create a structure- import text- insert illustrations – add captions-Table of contents- insert preface- decorate the page-templates-create the publications

Calculations: Start Excel- Enter data – Quick fill-Sum and difference-formatting – rounding up – find the function-templates

UNIT – IV

Manage data: Import data- Explore the data-sort- filters – number filters-select specific data- create a chart- import a list – create a table- add totals to table- compute column – table lookup- manage data using access- add records

UNIT – V

Presentations: Start a presentation- expand the slide-insert a picture-apply a theme-animations- run the show- other views – presenter view-use and download a template- print the slide show- rehearse timings-save the options – package for CD.

TEXT BOOK

1. *Michael price*.2011.**Office 2010.** Tata McGraw- Hill publisher private limited.

   UNIT –I : Chapter 1
   UNIT –II : Chapter 2
   UNIT – III : Chapter 3 and 4
   UNIT – IV : Chapter 5
   UNIT – V : Chapter 6

REFERENCE BOOK

1. *Bible* 2007. **Microsoft Office 2007**. Wiley India.

17UMA23P	CORE LAB – I : MS OFFICE	SEMESTER – II

Total Credits: 2
Hours Per Week:4

CONTENTS

MS – WORD

1. Type the text, check spelling and grammar bullets and numbering list items, align the text to left, right justify and center.
2. Prepare a job application letter enclosing your Bio-Data.
3. Create a Labels and Performing Mail Merger Operation.

MS – EXCEL

4. Prepare a Worksheet Using Formulae.
5. Create an electricity bill in a worksheet.
6. Illustrate a class performance by drawing graphs.

MS – ACCESS

7. Sort a techniques students database and printing address using label format.
8. Prepare a Pay roll report.
9. Create a Screen designing for data entry.

MS – POWERPOINT

10. Prepare a PowerPoint presentation with at least three slides for department Inaugural function.
11. Draw an organization chart with minimum three hierarchical levels.
12. Insert an excel chart into a Power Point slide.

17UMA2AA	ALLIED – II : STATISTICS - II	SEMESTER - II

PREAMBLE

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn moments, mean deviation, Modes of Binomial, Poisson and Normal Distribution.	K1
CO 2	Explain moment characteristic function of Rectangular distribution and Gamma distribution	K2
CO 3	Interpret Chi-square, student's t and F Distribution	K2
CO 4	Solve the problems in Chi-square, student's Distribution	K3
CO 5	Solve the problems in Normal distribution, Poission distribution, Gamma distribution, Fisher's t distribution, Fisher's Z distribution.	K3

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	M	M
CO4	S	S	M	M	M
CO5	S	S	M	M	M

S-Strong; M-Medium; L-Low

17UMA2AA	ALLIED – II : STATISTICS -II	SEMESTER - II

Total Credits:4
Hours Per Week:6

CONTENTS

UNIT I

Discrete Probability Distributions: Introduction - Discrete Uniform Distribution -Bernoulli Distribution - Binomial Distribution –Poisson Distribution

UNIT II

Continuous Probability Distributions: Introduction - Normal distribution –Rectangular or Uniform Distribution - Gamma Distribution

UNIT III

Exact Sampling Distributions-I: Introduction - Derivation of the Chi-Square Distribution- Moment Generating Function of Chi-square Distribution- Some theorems on Chi-Square Distribution- Linear Transformation – Applications of Chi-square Distribution

UNIT IV

Exact Sampling Distributions- II: Introduction- Student's t - Distribution- Applications of t- Distribution

UNIT V

Exact Sampling Distributions –II: F-distribution – Applications of F – Distribution - Relation between t and F Distributions - Relation between F and Chi-Square Distributions

TEXT BOOKS

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

   Unit- I : Chapter 8 : Section 8.1 – 8.5
   Unit -II : Chapter 9 : Section 9.1-9.3 & 9.5
   Unit -III : Chapter 15: Section 15.1-15.6
   Unit -IV : Chapter 16: Section 16.1-16.3
   Unit- V : Chapter 16**:** Section 16.5-16.8

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. **An Introduction to Statistical Methods** S.Chand & Co, New Delhi.
3. *Vittal.B.R.* 2015. **Mathematical Statistics**, Margham Publication, Chennai.

17UMA33A	CORE- V: TRIGONOMETRY, VECTOR CALCULUS AND FOURIER SERIES	SEMESTER – III

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

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

CO Number	CO Statement	Knowledge Level
CO 1	Recall the expansion of trigonometric function and hyperbolic function	**K1**
CO 2	Solve the logarithmic of complex quantities using trigonometric concept	**K2**
CO 3	Learn basic concept of vector calculus and line, surface and volume integrals	**K3**
CO 4	Verify Gauss Divergence , Green's and Stroke's theorem in vector calculus	**K3**
CO 5	Introduce general periodic function and learn how to express then as a Fourier series, which	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	M	S	S
CO4	S	M	S	M	S
CO5	S	S	S	S	S

S-Strong; M-Medium; L-Low

17UMA33A	CORE- V: TRIGONOMETRY, VECTOR CALCULUS AND FOURIER SERIES	SEMESTER - III

Total Credits:4
Hours Per Week:5

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 $sin^n\theta$ - **Hyperbolic functions**: Definition – Relations between hyperbolic function - Inverse hyperbolic functions.

UNIT -II

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

UNIT – III

Vectors Differentiation: Definition of vectors – Some standard results – Gradient – Divergence – Curl – Solenoidal – Irrotational problems.

UNIT –IV

Vector Integration : Line integral - surface and volume integrals – Gauss divergence theorem – Green's theorem – Stokes theorem- 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*. 2011. **Trigonometry**. S.VishwanathanPvt.Ltd.

   UNIT I: Chapter 3: Section 1, 4, 4.1

   Chapter 4: Section 1, 2, 2.1, 2.2, 2.3

   UNIT II:Chapter 5: Section 5, 5.1, 5.2

   Chapter 6: Section 1, 2, 3
2. *Vittal,P.R and Malini,.V*. 2014.**Vector Analysis**. Margham publications Chennai.

   UNIT III: Chapter 1

   UNIT IV: Chapter 2
3. *Narayanan.S and Manicavachagom Pillay .T.K*.2009. **Fourier Series**. S.VishwanathanPvt.Ltd.

   UNIT V: Chapter 1: Section 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., New Delhi. (Unit-I&II).
2. *Durai Pandian, P. Kayalal Pachaiyappa.* 2014. **Vector Analysis.** S.Chand & Company Ltd., New Delhi. (Unit-III &IV).

17UMA33B	CORE – VI: MECHANICS	SEMESTER - III

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

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

CO Number	CO Statement	Knowledge Level
CO 1	Define the basic concepts, Laws and theorems of forces, work, projectile and simple Harmonic motion.	**K1**
CO 2	Understand the relation between the forces and work done by the forces.	**K2**
CO 3	Demonstrate the equilibrium of a system of forces and reduction of system of forces.	**K2**
CO 4	Develop the general solution for Simple Harmonic Motion.	**K3**
CO 5	Build the path, greatest height, time of flight and range on horizontal plane as well as the range on an inclined	**K3**

Mapping with Programme outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	L	L	S	L
CO2	S	M	L	S	L
CO3	S	M	S	S	L
CO4	S	S	S	M	M
CO5	S	S	S	M	S

S-Strong; M-Medium; L-Low

17UMA33B	CORE – VI: MECHANICS	SEMESTER - III

Total Credits : 3
Hours Per Week : 5

CONTENTS

UNIT - I

Forces acting at a point – parallelogram of forces-triangle of forces- the polygon of forces- Lami's theorem-resolution of a force – conditions of equilibrium of any number of forces acting upon a particle.

UNIT- II

Coplanar forces acting on a rigid body: Theorem on reduction of any number of coplanar forces –condition for a system of coplanar forces to reduce to a single force or to a couple – 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.

UNIT -IV

Projectiles: Two fundamental principles- path of a projectile-characteristics 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.

UNIT- V

Simple harmonic motion: Simple Harmonic motion in a straight line – General solution and geometrical representation of SHM - Composition of two simple harmonic motions of the same period in a straight line and in two perpendicular lines.

TEXT BOOKS

1. *Venkataraman. M.K. 2016*. **Statics. 18th edition.** Agasthiar Publications, Trichy.
   UNIT I : Chapter 2
   UNIT II : Chapter 6 (Section 6.1 – 6.12)
   UNIT III : Chapter 9
2. *Venkataraman .M.K.2001*. **Dynamics.** 10th Edition. Agasthiar Publications. Trichy.
   UNIT IV : Chapter 6 (Section 6.1 to 6.16)
   UNIT IV : Chapter 10 (Section 10.1 to 10.7)

REFERENCE BOOKS

1. *Vittal P.R and Anantha Narayanan V. 2014***. Dynamics.**Margham Publications.
2. *Bali.N.P*.2007.**STATICS.** Lakshmi Publications Pvt. Ltd.

17UMA33C	CORE –VII: OPERATIONS RESEARCH-I	SEMESTER-III

PREAMBLE

1. The aim of this subject is to provide student with a broad and in depth knowledge of a range of Operations Research models and techniques, which can be applied to a variety of industrial fields.
2. To know about the concept of simplex and duality.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1.	Learn the basic concepts, models, methodology and applications of the Operations Research.	**K1**
CO2.	Demonstrate a real-world problem as a mathematical programming model to their optimization using graphical, Simplex, Two-phase and Big-M method.	**K2**
CO3.	Understand the relationship between a linear program and its dual, including strong duality and complementary slackness	**K2**
CO4.	Build the concept of a Transportation Model and Assignment Model to develop the initial basic feasible solution for the same.	**K2**
CO5.	Construct the formulation and solution for the Linear Programming Problems to get an optimal solution.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	M	S	S
CO3	S	M	S	M	S
CO4	S	S	S	M	S
CO5	S	S	S	M	S

S-Strong : M-Medium : L-Low

17UMA33C	CORE –VII: OPERATIONS RESEARCH-I	SEMESTER-III

Total 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.

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).

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.

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**. Sultan Chand & Sons Education Publications, New Delhi.

UNIT I : Chapter 1 Section 1.1-1.7
: Chapter 2 Section 2.1-2.2
: Chapter 3 Section 3.1-3.3

UNIT II : Chapter 4 Section 4.1, 4.3, 4.4

UNIT III: Chapter 5 Section 5.1-5.4, 5.7 & 5.9

UNIT IV: Chapter 10 Section 10.1-10.12

UNIT V: Chapter 11 Section 11.1-11.4, 11.6

REFERENCE BOOKS

1. *Gupta, P.K. and. Hira, D.S,* 2002**. Problems in Operations Research**. S. Chand Publication.
2. *Vittal, P.R,* 2013. **Operations Research** .Margham Publishers, Chennai.
3. *Taha, H.A.* 2006. **Operations Research: An Introduction.** Eighth Edition. Prentice Hall of India Private Limited, New Delhi.

17UMA33P	CORE LAB-II: RDBMS AND ORACLE	SEMESTER – III

Total Credits:2
Hours Per Week:4

CONTENTS

RDBMS AND ORACLE LAB

1. Create tables and write simple queries using
    a. Comparison operators
    b. Logical Operators
    c. Set operators
2. Create tables and write simple queries using Sorting and Grouping
3. Write Queries using GRANT and REVOKE
4. Creation of reports using column format
5. Update and alter tables using SQL
6. Write a PL/SQL to split the student's information table into two, one with the passed and other withy failed.
7. Write a PL/SQL block to prepare the electricity bill
8. Write Queries using the following string functions :
    a)CONCAT **b**) LENGTH **c**) LTRIM **d)** REPLACE **e**)SUBSTR
    f)RTRIM **g)**REVERSE **h**) UPPER **i**) TRIM **j**)INITCAP
9. Write Queries using the following number functions :
    a) ABS **b)** CIEL **c**) FLOOR **d)** MOD **e**) POWER
    f)LN **g)**LOG **h**)ROUND **i)** SQRT **j**) TRUNC
10. Write Queries using the following Aggregate and date functions :
    a) AVG **b**) SUM **c**) MAX **d)** MIN
    e) COUNT **f)** STDDEV **g)** VARIENCE **h**) SYSOLATE
    I) SYSTTIMESTAMP **j**) ADD-MONTHS

11. Write PL/SQL block to join two tables with Roll number and Address.
12. Create a database Trigger to check the data validity of record.
13. Write a PL/SQL program for Armstrong number.
14. Write PL/SQL program to swap two numbers without using temporary variable.
15. Write PL/SQL program to print the pattern.

```
                    *
                *   *   *
            *   *   *   *   *
        *   *   *   *   *   *   *
    *   *   *   *   *   *   *   *   *
```

17UCI3AB	ALLIED- III: BUSINESS ACCOUNTING – I	SEMESTER – III

PREAMBLE

1. To analyze business transactions from an accounting viewpoint.
2. To recognize, record, and classify new accounting data.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Describe the accounting cycle, write simple journal entries and compute a trial balance	**K1**
CO 2	Obtain knowledge to prepare final accounts of a company and to gain skills to detect and prevent errors in journal and ledger accounts	**K2**
CO 3	Capture the procedures relating to bills of exchange, Account current and Average due date	**K2**
CO 4	Understand accounting treatment for consignment and Joint venture	**K3**
CO 5	Perform cost volume profit analysis and identify relevant costs.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	M	M	S	M	S
CO2	M	M	S	M	S
CO3	L	M	M	M	M
CO4	L	M	M	M	M
CO5	L	M	S	L	S

S-Strong; M-Medium; L-Low

17UCI3AB	ALLIED- III: BUSINESS ACCOUNTING – I	SEMESTER – III

Total Credits : 4
Hours Per Week : 5

CONTENTS

UNIT – I

Fundamentals of Book Keeping: Definition, objectives, methods of accounting, Branches of accounting, Types of Accounts and Accounting rules –Accounting Concepts and Conventions–Journal–Ledger–Subsidiary books: Purchases Book, Sales Book, Purchases Returns, Sales Return book, Cash Book (Single Column, Double Column and Triple Column) – Trial balance.

UNIT – II

Final accounts of a sole trader with adjustments: Trading Account, Profit and loss account, Balance Sheet, Adjustments

UNIT – III

Bill of exchange: Definition of bill of exchange, essentials of Bill of exchange, classification of bill of exchange, Accounting Treatment Of Bill Of Exchange (bill retained, bill discounted with bank, bill endorsed, bill sent for collection, renewal of bill, Accommodation bills)–Average Due Date: Meaning, determination of due date, types of problems (where amount is lent in different installments and where amount lent in single installment)–Account current: Meaning, Methods of Calculation of Interest : Interest table method, Product Method, Red Ink Interest Method, Époque Method and varying interest rate method.

UNIT – IV

Accounting for consignments and Joint ventures: Consignment Meaning, definition, features, account sales, valuation of unsold stock, goods sent on consignment at cost price and invoice price, various commission to consignee (only Problem). Joint venture: Meaning, features, distinction between joint venture and partnership, joint venture and consignment, accounting treatment for joint venture: when keeping separate sets of books is kept and without keeping separate set of books (Only Theory).

UNIT – V

Cost accounting – Meaning - definition – Difference between cost accounting and financial accounting- Advantages and disadvantages- Element of cost - preparation cost sheet – stock levels-EOQ-Methods of pricing of stock issue-FIFO-LIFO Simple average method – weighted average method.

TEXT BOOKS

1. *Vinayakam N., Mani P.L., and Nagarajan K.L*, 2003, **Principles of Accountancy** , S.Chand& Company Ltd., New Delhi
2. *Jain S P and Narang K L*, 2000, **Cost accounting**, Kalyani publishers, New Delhi

REFERENCE BOOKS

1. *Gupta R.L., Gupta V.K. and Shukla M.C.,* 2006, **Financial Accounting**, Sultan chand& sons, New Delhi.
2. *Maheswari S.K., and Reddy T.S.,* 2005, **Advanced Accountancy**, Vikas publishers, New Delhi.

17UMA3SA	SKILL BASED SUBJECT –I: QUANTITATIVE APTITUDE I	SEMESTER - III

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

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

CO Number	CO Statement	Knowledge Level
CO 1	Recall H.C.F & L.C.M. of numbers and decimal fractions	**K1**
CO 2	Learn to find square roots, cube roots, surds and indices	**K1**
CO 3	Interrelate Ratio &Proportion, Time & work, pipes and cistern and time & Distances	**K2**
CO 4	Interpret the Mathematical expectations related to competitive examinations	**K2**
CO 5	Apply mathematical concepts to solve the problems on percentages and partnership	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	M	S
CO3	S	S	S	S	S
CO4	M	M	S	S	S
CO5	S	S	S	S	S

S-Strong; M-Medium; L-Low

17UMA3SA	SKILL BASED SUBJECT –I: QUANTITATIVE APTITUDE I	SEMESTER - III

Total Credits : 4
Hours Per Week : 4

CONTENTS

UNIT - I

Numbers – H.C.F. and L.C.M. of numbers–Decimal fractions - Simplifications.

UNIT - II

Square root and Cube root – Average – Problems on numbers.

UNIT - III

Problems on Ages – Surds and Indices – Percentage.

UNIT - IV

Profit and Loss – Ratio and Proportion – Partnership.

UNIT - V

Time and Work – Pipes and Cistern – Time and Distance.

TEXT BOOK

1. *Agarwal , R.S.2015* .**Quantitative Aptitude.** Seventh Revised Edition S. Chand and Company Ltd, New Delhi.

UNIT I : Chapter 1, 2, 3 , 4

UNIT II: Chapter 5, 6, 7

UNIT III: Chapter 8 , 9, 10

UNIT IV: Chapter 11, 12, 13

UNIT V: Chapter 15, 16, 17

REFERENCE BOOKS

1. *Abhijit Guha*. 2004. **Quantitative Techniques**. 5th edition, McGraw Hill education.
2. *Praveen R.V.2013,* **Quantitative Aptitude and Reasoning**. 2nd Edition, PHI learning Pvt.Ltd, Delhi – 110092.

17UMA43A	CORE –VIII: DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	SEMESTER - IV

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

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the basic concept of differential equation and its order.	K1
CO 2	Solve the differential equations of first order with constant and variable coefficients.	K2
CO 3	Solve the linear differential equations of second and higher order.	K2
CO 4	Solve linear differential equations using Laplace transform technique.	K3
CO 5	Develop the ability to apply differential equations.	K3

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	M	S	M	S
CO4	S	S	M	S	S
CO5	S	M	S	M	S

S-Strong; M-Medium; L-Low

17UMA43A	CORE –VIII: DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS	SEMESTER - IV

Total Credits : 4
Hours Per Week : 4

CONTENTS

UNIT -I

Differential Equations: Introduction - Solution of Differential Equations- Formation of Differential Equations. **Equation of the first order and of the first degree**: Variables Separable – Homogeneous Equations - Non homogeneous Equations – Linear Equation – Bernoulli's Equation – Exact Differential Equation with Integral Factors.

UNIT -II

Linear equation with constant coefficients: Definitions – The operators – Complementary function of a linear equation with constant coefficients – particular integral – Equations reducible to the linear equations.

UNIT -III

Simultaneous Differential Equations: Simultaneous equations of the first order and first degree – solution 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.

UNIT -IV

Partial Differential Equations of the first order: Introduction – classification of integrals – derivation of PDE by elimination of constants

and an arbitrary function – Lagrange's method – special methods – standard forms – Equations reducible to the standard forms – Charpit's method.

UNIT -V

The Laplace Transforms: Definition – Periodic functions – Some General theorems – The inverse Transforms – solution to Differential equations – Solution to differential equations with variable coefficients.

TEXT BOOK

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

   UNIT I : Chapter 1 & 2

   UNIT II : Chapter 5 Section 5.1 to 5.4, and 5.6

   UNIT III : Chapter 6

   UNIT IV : Chapter 12

   UNIT V : Chapter 9 Section 9.1 to 9.7, 9.9 and 9.10

REFERENCE BOOKS

1. *Bali.N.P.* 2004.**Differential Equations.**Laxmi Publication Ltd, New Delhi.
2. *M.L.Kannan*. **Differential Equations**, 1999, Jai Prakash Math& Co, Meerut.
3. *P.R.Vittal,* 2012, **Differential Equations, Fourier and Laplace Transforms, Probability**, Margham Publications, Chennai.
4. *Sankarappan.S, Kalavathy.S*2005. **Differential Equations and Laplace Transforms,** Vijay Nicole Imprints Private Limited,Chennai.

17UMA43B	CORE –IX: NUMBER THEORY	SEMESTER -IV

PREAMBLE

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Recall the Divisors, Greatest Common divisors, congruence's and its basic properties.	**K1**
CO 2	Understand the concept of Number-Theoretic functions, Quadratic Reciprocity law	**K2**
CO 3	Demonstrate the Fundamental theorem, Chinese remainder theorem, Fermat's theorem & Wilson's theorem	**K2**
CO 4	Apply Euclidean algorithm, Diophantine equation, Mobius inversion formula, Euler's phi function, Legendre symbol to solve the problems	**K3**
CO 5	Solve the problems to find GCD, order of integer modulo, primitive roots, composite numbers having primitive roots	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	M	S
CO5	S	S	S	M	S

S-Strong; M-Medium; L-Low

17UMA43B	CORE –IX: NUMBER THEORY	SEMESTER -IV

Total Credits : 3
Hours Per Week : 4

CONTENTS

UNIT-I

Preliminaries: 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 - The Sieve of Eratosthenes - Gold back conjecture. **The Theory of Congruences:** Basic properties of Congruence - Binary and Decimal Representations of integers - Linear Congruences and the Chinese Remainder Theorem.

UNIT-III

Fermat's Theorem: Pierre da Fermat - Fermat's Little Theorem and Pseudo primes – 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. **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 Section: 1.1-1.2 and 2.2-2.5

   UNIT II : Chapter 3 and 4 Section : 3.1-3.3 and 4.2-4.4

   UNIT III : Chapter 5 and 6 Section : 5.1-5.3 and 6.1-6.3

   UNIT IV : Chapter 7 and 8 Section : 7.2, 7.3 and 8.1-8.3

   UNIT V: Chapter 9 Section: 9.1-9.4

REFERENCE BOOKS

1. *Ivan Nivan and Herberts Zucherman*.2011. **An Introduction to Theory of Numbers**. Fifth Edition, Wiley Eastern Limited, New Delhi.
2. *Melvyn.B. Nathanson, 2006* **Methods in Number Theory**, Springer International Edition.

17UMA43C	CORE –X:OPERATIONS RESEARCH-II	SEMESTER-IV

PREAMBLE

1. To enhance student knowledge in Sequencing, game theory, performance measures of queues, optimal use of Replacement problem.
2. To enhance student knowledge in Network scheduling with applications.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1.	Learn the basic concepts in Sequencing, Game theory, Replacement, Queuing theory and	**K1**
CO2.	Demonstrate efficient methods to solve complex scheduling problems and strategic decision making using game theory to calculate optimal solution using different Strategies.	**K2**
CO3.	Construct replacement models in order to know when to replace a machine with considering cost	**K2**
CO4.	Apply queuing theory for infinite population having single channel, Poisson arrivals, and exponential service times and solve them by	**K3**
CO5.	Identify critical path analysis to solve real life project scheduling time and conduct literature search on the internet with the use of Operations Research techniques in various project execution	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	M	S
CO3	S	S	S	M	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S-Strong : M-Medium : L-Low

17UMA43C	CORE –X: OPERATIONS RESEARCH - II	SEMESTER - IV

Total 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.

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 $(M/M/1):(\infty/FIFO)$; $(M/M/1):(N/FIFO)$; $(M/M/C):(\infty/FIFO)$and $(M/M/C):(N/FIFO)$ 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**. Sultan Chand& Sons Education Publications, New Delhi, 11th revised edition.

UNITI : Chapter 12

UNIT II : Chapter 17 Section: 17.1-17.7

UNIT III : Chapter 18 Section: 18.1-18.3

UNIT IV: Chapter 20 Section: 20.1-20.4, 20.6-20.8

UNITV : Chapter 21

REFERENCE BOOKS

1. *Gupta, P.K. and. Hira, D.S,* 2002**.Problems in Operations Research**. S. Chand Publication.

2. *Vittal, P.R,* 2013. **Operations Research** .Margham Publishers, Chennai.

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

17UMA43D	CORE - XI: PROGRAMMING IN C & C++	SEMESTER - IV

PREAMBLE

1. On successful completion of this course the students should have gain the knowledge about class structure, member functions & data members.
2. To learn the concept of constructors, destructors, operator overloading and inheritance

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the concepts of Keywords and identifiers, Variables data types, declaration of variables and operators	**K1**
CO 2	Learn the concepts of Simple IF and Switch statement, The ?: Operator, The GOTO statement , The WHILE statement - the DO statement and FOR statement	**K1**
CO 3	Distinguish between C and C++ and learn the basic concepts of C++ programming	**K2**
CO 4	Demonstrate classes and objects, constructors and destructors	**K3**
CO 5	Explain Operator overloading and inheritance also make use of the concept in the programming.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	S	M	S
CO4	S	S	M	S	M
CO5	S	S	M	M	S

S-Strong : M-Medium : L-Low

17UMA43D	CORE - XI: PROGRAMMING IN C & C++	SEMESTER - IV

Total Credits : 2
Hours Per Week : 2

CONTENTS

UNIT - I

Introduction – Character set – C Tokents - Keywords and identifiers – Constants –Variables - Data types – Declaration of variables - Arithmetic operators - Relational operators - logical operators – assignment operators –increment and decrement operators –Conditional operators – Arithmetic expressions– Evaluation of Expressions.

UNIT - II

Simple IF statement - Switch statement –The ?: Operator - The GOTO statement - The WHILE statement - the DO statement - FOR statement

UNIT - III

Functions in C++: The main function – function prototyping – call by reference – return by reference – inline functions – default arguments – const arguments – Recursion - function overloading – math library functions. Managing Console I/O Operations: C++ streams – C++ stream classes – unformatted console I/O operations – formatted console I/O operations –managing output with manipulators.

UNIT - IV

Classes and Objects: Specifying a class – defining member functions – making an outside function inline – nesting of member functions – private member functions – arrays within a class – memory allocation for objects –arrays of objects – objects as function arguments – friend functions – returning objects – const member functions. Constructors and

Destructors: Introduction - constructors – parameterized constructors – multiple constructors in a class – constructors with default arguments – copy constructor.

UNIT - V

Operator Overloading: Introduction – defining operator overloading – overloading unary operators – overloading binary operators - overloading binary operators using friends – rules for overloading operators. Inheritance: Introduction – defining derived classes – single inheritance – making a private member inheritable – multilevel inheritance – multiple inheritances – hierarchical inheritance – hybrid inheritance.

TEXT BOOKS

1. *Balagurusamy, E. 2004.* **Programming in ANSI C.** Sixth Edition. Tata McGraw – Hill Publishing company limited, New Delhi.

   UNIT I: Chapter 2 , Section 2.1 to 2.8

   Chapter 3, Section 3.1 to 3.7 ,3.10, and 3.11

   UNIT II: Chapter 5, Section 5.1 to 5.3 and 5.7 to 5.9

   Chapter 6, Section 6.2 to 6.4

2. *Balagurusamy, E*. 2003. **Object Oriented Programming with C++.** SixthEdition .McGraw Hill- New Delhi.

   UNIT III:Chapter 4, Section 4.2 to 4.12

   Chapter 10, Section 10.2 to 10.6

   UNIT IV :Chapter5, Section 5.3 to 5.10 and 5.13 to 5.17

   : Chapter 6, Section 6.1 to 6.5 and 6.7

   UNIT V: Chapter 7, Section 7.1 to 7.5 and 7.8

   Chapter 8, Section 8.1 to 8.8

REFERENCE BOOKS

1. *Byron Gottfried*. 1998. **Programming with C**. Tata McGrawHill publishing company.
2. *Robert Lafore*. 2001. **Object Oriented Programming in Turbo C++.**Galgotia publications Private Ltd, New Delhi- 110002 .
3. *Bjarne Stroustrup*. 2001. **The C++ programming language.** Pearson Education- New Delhi.

17UMA43P	CORE LAB -III: PROGRAMMING IN C & C++	SEMESTER - IV

Total Credits : 2
Hours Per Week : 4

CONTENTS

1. Write a Program to demonstrate the use of math functions.
2. Create a Program to find the sum of the series sum equal to $1+(1/2)^2+(1/3)^3+(1/4)^4+\ldots$
3. Write a Program to perform the addition of time in the hour and minutes format.
4. Create a Program to find the transpose of matrix by using friend function.
5. Write a Program to evaluate a function 'power c( )'to raise a number 'm' to a power 'n'.
6. Create a Program to compute compound interest using function overloading.
7. Create a class which consists of employee details, Derive a class PAY from the above class and calculate DA, HRA and PF depending on the grade and display the pay slip in a neat format using console I/O.
8. Define two classes POLAR and RECTANGLE to represent points in the polar and rectangle system. Write a program to convert from one system to another.
9. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.
10. Write a Program to find the square root value by getting various formatting flags.

11. Write C++ Program to demonstrate example of friend function with class.
12. Write C++ Program to create class to get and print details of a student.

17UCI4AB	ALLIED –IV: BUSINESS ACCOUNTING – II	SEMESTER - IV

PREAMBLE

1. To enable the students to understand the accounting aspects of finance in business
2. To enable the students to understand the accounting aspects Depreciation, Branch accounts, Hire Purchase and Installment System, Single Entry and Budgeting.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Determine the impact of profits by using different depreciation methods	**K1**
CO 2	Construct a trading, profit and loss account and balance sheet from the records of single entry system after locating missing information	**K2**
CO 3	Learn accounting treatment for dependent branches and independent branches	**K2**
CO 4	Record the transaction in the journal of hire-purchaser and hire vendor	**K3**
CO 5	Apply financial disciplines to the management of organizations as well as to set up and operate a budgetary control system	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	M	L	M	L	M
CO2	L	M	S	M	M
CO3	M	M	S	M	L
CO4	L	M	M	M	L
CO5	M	M	S	M	S

S-Strong; M-Medium; L-Low

17UCI4AB	ALLIED –IV: BUSINESS ACCOUNTING – II	SEMESTER - IV

Total Credits : 4
Hours Per Week : 5

CONTENTS

UNIT – I

Depreciation - Meaning- Features- Methods- Straight Line Method– Written Down Value Method - Annuity Method.

UNIT – II

Single Entry System – Meaning and Features –Limitations- Advantages- Statement of Affairs Method and Conversion Method.

UNIT – III

Branch Accounts - Introduction – Meaning – Objectives – Types of Branches - Dependent Branches – Features – Supply of Goods at Cost Price - Invoice Price – Branch Account in the books of Head Office - Debtors System Only (Excluding foreign branches).

UNIT – IV

Hire Purchase and Installment Systems- Accounting treatment– Calculation of interest –Default and repossession (Excluding Hire Purchase Trading Account)

UNIT – V

Budgeting- meaning and definition- advantages and disadvantages – production budget, sales budget, Cash budget, flexible budget.

TEXT BOOKS

1. *Dr. Maheswari S.N*, 2004 , "**Management Accounting**", Sultan Chand & Sons, New Delhi.
2. *Gupta R.L.,Gupta V.K., and Shukla M.C.,*2008, **FinancialAccounting–**New Delhi, Sultan Chand&Sons.

REFERENCE BOOKS

1. *Srinivasan and Ramachandran*, **Management Accounting**, Sultan Chand & Sons Ltd, New Delhi.
2. *JainS.P.,* 2010, **Principles of Accountancy** –Kalyani Publishers, New Delhi.

Note: The question paper shall cover 20% theory and 80% problem

17UMA4SA	SKILLED BASED SUBJECT-II : QUANTITATIVE 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

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

CO Number	CO Statement	Knowledge Level
CO 1	Recall the basic concepts on simple interest, compound interest, volumes & surface areas	**K1**
CO 2	Learn the concepts on Allegations or Mixture, odd man out and series	**K1**
CO 3	Understand the concepts on permutation, combinations & probability	**K2**
CO 4	Interpret the data on tabulation, bar graphs, pie graphs and line graphs	**K2**
CO 5	Solve the problems on Area & Volume , Heights & Distances	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	S
CO3	S	S	S	M	S
CO4	S	S	S	S	S
CO5	S	S	S	M	S

S-Strong; M-Medium; L-Low

17UMA4SA	SKILLED BASED SUBJECT-II : QUANTITATIVE APTITUDE - II	SEMESTER– IV

Total Credits : 4
Hours Per Week : 4

CONTENTS

UNIT - I

Allegation or Mixture – Simple Interest and Compound Interest.

UNIT - II

Area - Volume and surface areas.

UNIT – III

Calendar clocks – Height and distance

UNIT - IV

Permutations and combinations - probability - odd man out series.

UNIT -V

Data Interpretation: Tabulation- Bar graphs-Pie graphs- Line graphs.

TEXT BOOK

1. *Agarwal , R.S.2015* .**Quantitative Aptitude.** Seventh Revised Edition S. Chand and Company Ltd, New Delhi.

   UNIT I : Chapter 20,21,22
   UNIT II: Chapter 24,25
   UNIT III: Chapter 27,28,34
   UNIT IV: Chapter 30,31,35
   UNIT V: Chapter 36,37,38,39

REFERENCE BOOKS

1. *Abhijit Guha*. 2004. **Quantitative Techniques**. 5th edition, McGraw Hill education.
2. *Praveen R.V.2013,* **Quantitative Aptitude and Reasoning**. 2nd Edition, PHI learning Pvt.Ltd, Delhi – 110092.

17UMA53A	CORE – XII: REAL ANALYSIS I	SEMESTER – V

PREAMBLE

1. The students should gain the knowledge aboutreal number systems , sets and metric space.
2. The students should gain the knowledge about elements of points set topology.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Remember the fundamental knowledge in number systems and real number systems	**K1**
CO 2	Understand the notations and terminology in relations and functions to manipulate the problems.	**K2**
CO 3	Demonstrate the different types of points in real number system and manipulate the fundamental theorems.	**K3**
CO 4	Apply the concepts of spaces and manipulate the theorems in metric spaces.	**K3**
CO 5	Abstract thinking of sequences, demonstrate the various sequences and learn basic techniques in continuous functions.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	S	M
CO2	M	M	S	S	M
CO3	S	S	M	S	M
CO4	S	M	S	S	S
CO5	M	M	M	S	S

S-Strong; M-Medium; L-Low

17UMA53A	CORE – XII: REAL ANALYSIS I	SEMESTER – V

Total Credits : 5
Hours Per Week : 5

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 approximations 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

Some 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 Cantor's 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. *Tom M. Apostol*. 2002. **Mathematical Analysis.**Narosa Publishing House Pvt. Ltd. Second Edition.
   UNIT I: Chapter 1: Section 1.1 – 1.20
   UNIT II: Chapter 2: Section 2.1 – 2.15
   UNIT III: Chapter 3: Section 3.1 – 3.9
   UNIT IV: Chapter 3: Section 3.10 – 3.16
   UNIT V: Chapter 4: Section 4.1 – 4.5, 4.7 – 4.9, 4.11

REFERENCE BOOKS

1. *Somasundaram.D,Choudhary.B*.2015. **A first course in Mathematical Analysis,**Narosa publishing house.
2. *Mainak Mukherjee.* 2015. **A course in Real Analysis,** Narosa publishing house.
3. *Shanti Narayan, Dr.M.D. Raisinghania*.2014. **Elements of Real Analysis,** S.Chand and company Pvt. Ltd.,New Delhi
4. *Dipak Chatterjee.2005.* **Real Analysis.** Prentice- Hall of India Pvt. Ltd., New Delhi.

17UMA53B	CORE -XIII :COMPLEX ANALYSIS - I	SEMESTER – V

PREAMBLE

1. The students should gain knowledge about the origin, complex plane and Analytic function.
2. To know about the concept of application of complex numbers and complex functions.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the concepts of equations of straight lines and circles, elementary transformation, infinity and extended complex plane, stereographic projection and C-R equation in polar coordinates	**K1**
CO 2	Learn the concepts of Bilinear transformation, Special bilinear transformations, Circle and inverse points	**K1**
CO 3	Distinguish between convergence and uniform convergence, logarithmic functions, function a^z and Harmonic functions	**K2**
CO 4	Demonstrate Analyticity of the sum of power series, Uniqueness of representation of a function by a power series	**K3**
CO 5	Explain integration of complex functions, definite integrals, interior & exterior of closed curve and Simply connected region with Cauchy's fundamental theorem	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	M	M	M
CO3	S	M	M	M	M
CO4	S	M	M	M	M
CO5	S	M	M	M	M

S-Strong; M-Medium; L-Low

17UMA53B	CORE -XIII :COMPLEX ANALYSIS - I	SEMESTER – V

Total Credits : 5
Hours 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 – simple problems. **Sets of complex points:** Closed sets – open sets – theorems on bounded infinite sets.

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 – Simple problems.

UNIT –III

Elementary and conformal mappings: Bilinear transformation – Special bilinear transformations – Circle and inverse points – Transformations $w = z^2, w = \sqrt{z}$, $w = e^z, w = \sin z$ *and* $w = \cos z$ - conformal mappings – simple problems.

UNIT- IV

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 –logarithmic functions and function a^z – branch point - Harmonic functions – simple problems.

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. *DuraiPandian ,kayalalPachaiyappa.P.* 2014. **Complex Analysis**. S.Chand&companyPvt. Ltd, New Delhi..

   UNIT I : Chapter 2 Sections 2.4 to 2.9,
   Chapter 3 Sections 3.1 to 3.3

   UNIT II : Chapter 4 Sections 4.1 to 4.8 and 4.10

   UNIT III : Chapter 7 Sections 7.1 to 7.8

   UNIT IV : Chapter 6 Sections 6.1 to 6.9; and 6.12, 6.13

   UNIT V : Chapter 8 Sections 8.1 to 8.8

REFERENCE BOOKS

1. *Arumugam.S, ThangapandiIssac.A and Somasundaram.A, 2014.* **Complex Analysis**, Scitech publications (India) Pvt Ltd.
2. *Venkatachalapathy.S.G. 2014.* **Complex Analysis.(**For B.Sc Mathematics**),** Marghampublictions, Chennai.

17UMA53C	CORE – XIV: MODERN ALGEBRA	SEMESTER – V

PREAMBLE

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

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Remember the knowledge of fundamental concepts in sets, functions, mappings, relations and integers.	**K1**
CO 2	Understand the definitions and theorems of group and utilize them to prove related results.	**K1**
CO 3	Demonstrate an ability to understand and manipulate the theorems in Homomorphisms	**K2**
CO 4	Manipulating the examples of Rings and special classes of Rings.	**K3**
CO 5	Apply the concept of Rings, prove the theorems in quotient rings and integral domain	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	M	M	S	S	S
CO3	S	S	M	S	M
CO4	M	M	S	S	S
CO5	M	M	S	M	S

S-Strong; M-Medium; L-Low

17UMA53C	CORE – XIV: MODERN ALGEBRA	SEMESTER – V

Total Credits : 4
Hours Per Week : 5

CONTENTS

UNIT - I

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

UNIT - II

Group Theory: Subgroups – Cyclic subgroup – Lagrange's theorem- Index of a group – Order of an element – Euler theorem - Fermat theorem – A Counting Principle - Normal Subgroups and Quotient Groups.

UNIT - III

Group Theory: Homomorphisms – Fundamental theorem of homomorphism of group - Cauchy's theorem for Abelian groups – Sylow's theorem for Abelian groups - Automorphisms – Inner automorphism - Cayley's theorem - Permutation groups.

UNIT - IV

Ring Theory: Definition and Examples of Rings–Some Special Classes of Rings – Commutative Ring – Field – Integral domain - Homomorphisms.

UNIT - V

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

TEXT BOOK

1. *Herstein, I. N. 2006*. **Topics in Algebra.** John Wiley & Sons, New York.

   UNIT I : Chapter 1 Section 1.1 to 1.3, Chapter 2 Section 2.1 to 2.3

   UNIT II : Chapter 2 Section 2.4 to 2.6

   UNIT III : Chapter 2 Section 2.7 to 2.10

   UNIT IV : Chapter 3 Section 3.1 to 3.3

   UNIT V : Chapter 3 Section 3.4 to 3.7

REFERENCE BOOKS

1. *Surjeet Singh and Qazi Zameeruddin*, 1992. **Modern Algebra.**Vikas Publishing House.
2. *Vasishtha, A.R*. 1994. **Modern Algebra.** Krishna PrakashanMandir, Meerut.
3. *S. Arumugam and A.Thangapandi Isaac*. 2014.**Modern Algebra.** Scitech Publications (India) Pvt.Ltd
4. *S.G.Venkatachalapathy*, **Modern Algebra (For B.Sc Mathematics Major)**, MarghamPublications,Chennai.

17UMA53D	CORE- XV: FUNDAMENTALS OF DATA SCIENCE & R PROGRAMMING	SEMESTER – V

PREAMBLE

1. The students should have concrete knowledge about the fundamentals of data science.
2. To gain an in-depth understanding of data structure used in R and learn to import/export data in R

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Describe what is Data Science and the skill sets needed to be a data scientist and R-language.	**K1**
CO 2	Explain in basic terms what Statistical Inference means. Identity probability distributions commonly used as foundations for statistical modeling.	**K1**
CO 3	Explain limitations of R and R Objects.	**K2**
CO 4	Understand the I/O of R, looping functions.	**K2**
CO 5	Apply basic machine learning algorithms (Linear Regression, k-Nearest (k-NN), k-means Naïve Bayes) for predictive modeling.	**K2**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	M	M	M
CO4	S	S	S	S	S
CO5	S	S	S	M	M

S-Strong; M-Medium; L-Low

17UMA53D	CORE- XV: FUNDAMENTALS OF DATA SCIENCE & R PROGRAMMING	SEMESTER – V

Total Credits : 2
Hours Per Week : 2

CONTENTS

UNIT -I

Introduction to Data Science - Big Data and Data Science Hype - Getting Past the Hype – Datafication - The Current Landscape - A Data Science Profile – Definition of Meta.

UNIT- II

Statistical Inference – Population and samples – Population and samples of Big Data – Modelling – Exploratory Data Analysis : Philosophy of Exploratory Data Analysis – The Data Science Process.

UNIT -III

Algorithms – Machine learning algorithms – Linear Regression – K-Nearest Neighbor Algorithm.

UNIT -IV

History and Overview of R – Definition of S - Basic Features of R – Design of the System – Limitation of R – Entering Input Evaluation – R Objects – Numbers – Attributes – Creating Vectors – Mixing Objects Explicit Coercion – Matrices – Lists – Factors – Missing Values – Data Frames – Names.

UNIT -V

Getting Data In and Out of R – Reading and Writing Data Reading Data Files with read.table() Reading in Larger Datasets with read.table Calculating Memory Requirements for R –Objects Using the reader Package Using Textual and Binary Formats for Storing Data Using dput() and dump() – Control structure – functions – looping functions.

TEXT BOOKS

1. *Rachel Schutt*, **Doing Data Science Straight Talk from the frontline** , O'Reilly Media publisher,1st edition,2013.
   UNIT I : Chapter 1
   UNIT II : Chapter 2
   UNIT III : Chapter 3
2. *Roger S.Peng*,**R Programming for Data Science**, Lean publisher,2015.
   UNIT IV : pgno : 4,6-7,12-21
   UNIT V : pgno : 23-26 , 27,28-30, 62-68,70,77.

17UMA53P	CORE LAB-IV: R PROGRAMMING	SEMESTER – V

Total Credits : 2
Hours Per Week : 4

CONTENTS

USING R PROGRAMMING

1. Calculate and print a Multiplication Table.
2. Check a number is Prime number or not.
3. Print Factorial of a number.
4. Find the Armstrong number.
5. Print Fibonacci series.
6. Check for a leap year.
7. Find the sum of N Natural numbers.
8. Take input from user.
9. Find the minimum and maximum of set of numbers.
10. Add two vectors.
11. Make a simple calculator.
12. Find L.C.M
13. Compute f(x) = $\begin{cases} \exp\left(\frac{x+\ln(1+x^2)}{x^2}\right) & if\ x > 0 \\ 10 & if\ x = 0 \\ \frac{2+x^3}{x} & if\ x < 0 \end{cases}$

    and plot with line over a value of x as a sequence starting from -1 to 5 and increasing it by 0.2

14. Compute $\frac{\sum_{i=1}^{n} x_i^2}{\sum_{i=1}^{n} y_i^2}$ and $\sum_{i=1}^{n}\left(\frac{x_i}{y_i}\right)^2$, where $x = (x_1, x_2, \ldots, x_n)$ and $y = (y_1, y_2, \ldots, y_n)$ are two vectors.

15. Import CSV and tabular data file.

16. Create Three Dimensional Scatter plots.

17UMA5SP	SKILL BASED SUBJECT- III: LATEX	SEMESTER – V

Total Credits : 2
Hours Per Week : 4

CONTENTS

USING LATEX

1. Create a document and type mathematical formulas.
2. Obtain the equation of Gauss divergence theorem.
3. Obtain the equation of Green's theorem.
4. Produce an infinite series.
5. Produce the expression of function in two different intervals.
6. Buckling load of a column loaded by its own weight.
7. Obtain Continued fraction.
8. Obtain a partial differential equation.
9. Insert a graph or picture in a document
10. Insert a table with multiple columns.
11. Create a Power Point Presentation.
12. Produce matrix form of an equation.

17UMA63A	CORE –XVI: REAL ANALYSIS - II	SEMESTER– VI

PREAMBLE

1. The students should gain the knowledge about limits and Continuity, derivatives, and functions of bounded variations.
2. The students should gain the knowledge about The Riemann - Stieltjes integral

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Recollect the knowledge in limits and continuity with examples.	**K1**
CO 2	Abstract thinking of continuity and functions, discuss examples and theorems.	**K2**
CO 3	Consideration the concept of derivatives, demonstrate the theorems and properties.	**K3**
CO 4	Apply the concept of functions, manipulate the properties in functions and bounded variations.	**K3**
CO 5	Construct the theorems and properties of integrals and integration by parts.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	M
CO2	S	M	S	S	M
CO3	S	M	S	S	S
CO4	S	S	M	M	M
CO5	S	S	M	S	S

S-Strong; M-Medium; L-Low

17UMA63A	CORE –XVI: REAL ANALYSIS - II	SEMESTER– VI

Total Credits : 5
Hours Per Week : 5

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 contractions – Discontinuities of real-valued function – 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 and Rectifiable curves: 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. *Tom M. Apostol.* 2002. **Mathematical Analysis.**Second Edition.Narosa Publishing house Pvt. Ltd.

   UNIT I : Chapter 4: Section 4.12 – 4.15

   UNIT II : Chapter 4: Section 4.16 – 4.23

   UNIT III : Chapter 5: Section5.1 – 5.12

   UNIT IV : Chapter 6: Section 6.1 – 6.8

   UNIT V : Chapter 7: Section7.1 – 7.7

REFERENCE BOOKS

1. *Somasundaram.D,Choudhary.B.*2015. **A first course in Mathematical Analysis,**Narosa publishing house.
2. *Mainak Mukherjee.* 2015. **A course in Real Analysis,** Narosa publishing house.
3. *Shanti Narayan, Dr.M.D.Raisinghania*. 2014. **Elements of Real Analysis,** S.Chand and company Pvt. Ltd.,New Delhi
4. *Dipak Chatterjee.2005.* **Real Analysis.** Prentice- Hall of India Pvt. Ltd., New Delhi.

17UMA63B	CORE – XVII:COMPLEX ANALYSIS - II	SEMESTER– VI

PREAMBLE

1. The students should gain knowledge about the complex integration and singularities.
2. To know about the concept of application of complex numbers and complex functions.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the concepts of Cauchy's integral formula and formulas for derivatives - zeros of a function	**K1**
CO 2	Learn the concepts of zeros of an analytic function	**K1**
CO 3	Distinguish between Singularity, Isolated singularity, Removable singularity, Essential singularity, Behavior of a function at an isolated singularity	**K2**
CO 4	Demonstrate Residues and calculation of residues	**K3**
CO 5	Explain Taylor's series , zeros of an analytic function, Laurent's series and Meromorphic functions, Function meromorphic in the extended plane	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	M	S	M
CO3	S	M	S	S	M
CO4	S	S	S	M	S
CO5	S	S	M	S	M

S-Strong; M-Medium; L-Low

17UMA63B	CORE – XVII: COMPLEX ANALYSIS - II	SEMESTER– VI

Total Credits : 5
Hours Per Week : 5

CONTENTS

UNIT- I

Complex integration: Cauchy's integral formula and formulas for derivatives - zeros of a function – related integral theorems – 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 singularity – Removable singularity – Essential singularity – Behaviour of a function at an isolated singularity – determination of nature of singularity – 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, KayalalPachaiyappa.P* 2014. **Complex Analysis**. S.Chand and Sons Publications, New Delhi.

   UNIT I : Chapter 8 Section 8.9 to 8.13

   UNIT II : Chapter 9 Section 9.1 to 9.4 and 9.13

   UNIT III : Chapter 9 Section 9.5 to 9.13

   UNIT IV : Chapter 10 Section 10.1 to 10.4

   UNIT V : Chapter 11 Section 11.1 to 11.3

REFERENCE BOOKS

1. *Arumugam.S, ThangapandiIssac.A and Somasundaram.A, 2014.* **Complex Analysis**, Scitech publications (India) Pvt Ltd.
2. *Venkatachalapathy.S.G. 2014.* **Complex Analysis.(**For B.Sc Mathematics**),** Marghampublictions, Chennai.

17UMA63C	CORE XVIII: JAVA PROGRAMMING	SEMESTER - VI

PREAMBLE

1. The students should learn the basic Java programming concepts.
2. The student should learn about wide range of Applications and Applets using Java.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Identify and reproduce the features of Object Oriented programming paradigm	**K1**
CO 2	Learn the constants, variables and data types, decision making and Branches, Operators and Looping.	**K1**
CO 3	Describe the Java Packages, multithreading, and interface concepts.	**K2**
CO 4	Manage errors and exception, design Applet and execute Applet, draw graphs and shapes.	**K3**
CO 5	Use I/O functionality to code basic file operations and experiment with exceptions handling.	**K3**

Mapping with Programme outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	**S**	**S**	**S**	**S**	**S**
CO2	**S**	**S**	**S**	**S**	**S**
CO3	**S**	**S**	**S**	**S**	**M**
CO4	**S**	**S**	**S**	**S**	**M**
CO5	**S**	**S**	**M**	**M**	**M**

S-Strong; M-Medium; L-Low

17UMA63C	CORE XVIII: JAVA PROGRAMMING	SEMESTER - VI

Total Credits : 2
Hours Per Week : 2

CONTENTS

UNIT - I

Fundamentals of Object – Oriented Programming- Java Evolution – Overview of Java Language.

UNIT - II

Constants, Variables and Data Types – Operators and Expressions – Decision Making and Branching- Decision Making and Looping - Classes, Objects and Methods.

UNIT - III

Arrays, Strings and Vectors – Interfaces: Multiple Inheritance – Packages: Putting classes together – Multithreaded programming.

UNIT - IV

Managing Errors and Exceptions – Applet Programming – Graphics Programming.

UNIT - V

Managing Input / Output Files in Java: Concepts of streams – stream classes – Byte stream classes – Character stream classes – Using streams – I/O Classes – File Class – I/O exceptions – Creation of files – Reading/Writing characters, Byte – Handling primitive data types – Random Access Files – Other stream classes .

TEXT BOOK

1. *Balagurusamy.E**PROGRAMMING WITH JAVA – A PRIMER** , 5th Edition.* MC Graw Hill Education (India) Pvt. Ltd.

   UNIT I : Chapter 1, 2, 3

   UNIT II : Chapter 4, 5, 6, 7, 8

   UNIT III : Chapter 9, 10, 11, 12

   UNIT IV : Chapter 13, 14, 15

   UNIT V : Chapter 16

REFERENCE BOOKS

1. *Patrick Naughton & Hebert Schildt,***JAVA™ 2:THE COMPLETE REFERENCE,** 3rd Edition, Tata MC Graw Hill education Pvt. Ltd.
2. *John R. Hubbard* ,**PROGRAMMING WITH JAVA**, 2nd Edition, Tata MC Graw Hill education Pvt. Ltd.

17UMA63P	CORE LAB-V: JAVA PROGRAMMING	SEMESTER - VI

Total Credits : 2
Hours Per Week : 4

CONTENTS

Write a Java Program

1. To print the triangle of numbers.
2. To create and display a message on the windows.
3. To draw several shapes in the created window.
4. To find odd or even numbers among n numbers.
5. To calculate standard deviation.
6. To extract a portion of a character string and print the extracted string.
7. To implement the concept of multiple inheritance using interfaces.
8. To implement the concept of multithreading.
9. To create a frame with four text field such as name, street, city, and pin code with suitable table with one button.
10. To implement the concept of exception handling.
11. To check whether a given number is Armstrong number or not.
12. To sort an array of elements using bubble short algorithm.
13. To perform Matrix multiplication.
14. To get the prime numbers between a given range.
15. To print Floyd Triangle

17UMA6SP	SKILL BASED SUBJECT- IV: ADVANCED EXCEL	SEMESTER– VI

Total Credits : 2
Hours Per Week : 4

CONTENTS

1. Solve Linear Programming Problem using Excel Solver.
2. Obtain a solution for Integer Programming Problem using Excel Solver.
3. Solve Quadratic Programming problem using Excel Solver
4. Perform the following Built-in-functions
   (i) Math
   (ii) Trigonometry
   (iii) Statistical
   (iv) Financial
   (v) Text
5. Generate ANOVA table using analysis tool pack.
6. Find the correlation and regression using analysis tool pack.
7. Create different types of charts for a give data.
8. Create a formula for financial applications:
   PV, PMT, NPER, RATE & Depreciation Calculations
9. Format Pivot Table and make Dynamic Pivot Tables
10. Format Pivot charts and makes Dynamic Pivot Charts
11. Create a file in Excel that describes a grading system for a class using advanced Excel features.
12. Simulate Deal or No-Deal game in Excel.

17UMA5EA	ELECTIVE- I: ASTRONOMY – I	SEMESTER – V

PREAMBLE

1. The students should gain knowledge about Celestial sphere
2. The students should gain knowledge about Astronomy.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the current accepted theories of solar systems, spherical trigonometry and the Kepler's law of motion.	**K1**
CO 2	Discuss the scientific reasoning of Equator, Zenith, nadir and variation in length of the day.	**K2**
CO 3	Demonstrate the Latitude and Longitude, Twilight.	**K2**
CO 4	Discuss and manipulate the tangent formula and Cassinis formula.	**K3**
CO 5	Interpret the motion of interior and superior planets, Relation between true eccentric and mean anamolies.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	L
CO2	S	S	S	M	L
CO3	M	M	M	M	M
CO4	M	M	L	L	L
CO5	M	M	L	L	L

S-Strong; M-Medium; L-Low

17UMA5EA	ELECTIVE- I: ASTRONOMY – I	SEMESTER – V

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

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

UNIT - II

Celestial sphere – Pole – Equator – Zenith, nadir, meridian, Celestial co – ordinates – Diurnal motion and simple problems – Variation in length of the day – Representation of celestial objects on the celestial sphere.

UNIT - III

Dip of the horizon – perpetual day, duration of day – Latitude and Longitude – Night variations -Twilight – Geocentric parallex.

UNIT - IV

Refraction – aberration, heliocentric parallax definitions and formula - Tangent formula – Cassinis formula.

UNIT - V

Kepler's laws of planetary motion – motion of inferior and superior planets - Relation between true eccentric and mean anamolies.

TEXT BOOK

1. *Kumaravelu and S. Susheela* .2005.**ASTRONOMY.**S.Chand and Company Ltd, Ram Nagar, New Delhi -55

17UMA5EB	ELECTIVE- I: NUMERICAL METHODS – I	SEMESTER – V

PREAMBLE

1. The student gains the knowledge about solving the linear equations numerically.
2. The student gains the knowledge about finding interpolation by using difference formulae.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Recall numerical solutions of nonlinear equations in single variable	K1
CO 2	Understand elementary linear algebra techniques and how to apply them to numerical methods	K2
CO 3	Identify the interpolation for equal and unequal intervals and solve them	K2
CO 4	Construct the numerical methods in modern scientific computing	K3
CO 5	Illustrate the fundamental mathematical theories and algorithms underlying modern numerical methods	K3

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	M	S	S	M
CO3	S	S	S	S	S
CO4	S	M	S	M	S
CO5	S	S	M	S	S

S-Strong; M-Medium; L-Low

17UMA5EB	ELECTIVE- I: NUMERICAL METHODS – I	SEMESTER – V

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

The solution of numerical algebraic and transcendental Equations: Introduction - Bisection method – Iteration Method – Convergence condition – Regula Falsi Method – Newton – Raphson method - Convergence Criteria – Order of Convergence.

UNIT - II

Solution of simultaneous linear algebraic equations: Introduction – Direct methods - Gauss elimination method – Gauss Jordan method – Method of Triangularization – Crout's method –Iterative methods - Gauss Jacobi method – Gauss Seidel method.

UNIT - III

Finite Differences: Introduction - Differences – operators – forward and backward difference tables – Differences of a polynomial – Factorial polynomial – Error propagation in difference table.

UNIT - IV

Interpolation for equal intervals: Introduction - Newton's forward and backward interpolation formula – Error in Newton's forward and backward interpolation formula - equidistant terms with one or more missing values. **Central differences interpolation formulae :**Central

differencesand central difference table – Gauss's forward and backward interpolation formulae.

UNIT - V

Interpolation with unequal interval: Introduction - Divided differences – Properties of divided differences – Relation between divided differences and forward differences – Newton's divided differences formula – Lagrange's interpolation formula – inverse interpolation.

TEXT BOOK

1. *Kandasam. P, Thilagavay. K and Gunavathy. K.* 2014. **Numerical Methods**. S. Chand and Company PVT Ltd, New Delhi.

   UNIT I : Chapter 3 Section 3.1-3.4

   UNIT II : Chapter 4 Section 4.1-4.9

   UNIT III : Chapter 5 Section 5.1-5.5

   UNIT IV : Chapter 6 Section 6.1-6.7

   Chapter 7 Section 7.1-7.4

   UNIT V : Chapter 8 Section 8.1-8.8

REFERENCE BOOKS

1. *Venkataraman. M. K.* 1999. **Numerical Methods in Science and Engineering**. V Edition. National Publishing Company. Chennai
2. *Arumugam. S, ThangapandiIssac. A, Somasundaram.A,* 2007, **Numerical Methods**. Second Edition, Scitech publications India Pvt.Ltd.
3. *Sastry.S.S,***Introductory Methods of Numerical Analysis**, 2006, 4thEdition.prentice Hall of India Private Limited, New Delhi.

17UMA5EC	ELECTIVE- I: DISCRETE MATHEMATICS	SEMESTER - V

PREAMBLE

1. On successful completion of this course the students should gain knowledge about Functions, Relations, Digraphs, Lattices and Boolean algebra.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Define the basic concepts of functions, Relations, Language, Grammar, and Boolean Algebra.	**K1**
CO 2	List the fundamental algorithms used by the computer programmers.	**K1**
CO 3	Understand finite state to represent the special grammars and languages.	**K2**
CO 4	Apply the relation to map X – values and Y – values by ordered pairs.	**K2**
CO 5	Apply the logical solution and writing program using the concept of Boolean algebra.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	L	L
CO2	S	S	S	M	M
CO3	L	L	S	S	M
CO4	M	M	S	S	S
CO5	M	M	S	S	S

S-Strong; M-Medium; L-Low

17UMA5EC	ELECTIVE- I: DISCRETE MATHEMATICS	SEMESTER - V

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT-I

Logic: 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 – Equivalence Relations – Manipulation of Relations.

UNIT – III

Functions: Functions – Functions for computer science – Permutation functions-Growth of functions. **Trees**: Trees – Labeled Trees.

UNIT – IV

Order relations and Structures: Partially ordered 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 Languages and Grammars– Finite State Machines – Semigroup,

Machines and Languages – Machines and Regular Languages-Simplification of Machines.

TEXT BOOK

1. *Kolman . B, Busby. R.C. and Ross. S.* 2006**. Discrete Mathematical Structures.** 3rd Edition. Prentice hall of India Pvt. Ltd. New Delhi.

UNIT I : Chapter 2 and 3

UNIT II : Chapter 4 Section 4.1 to 4.5 and 4.7

UNIT III : Chapter 5 , Chapter 8 Section 8.1-8.2

UNIT IV : Chapter 7 Section 7.1-7.5

UNIT V : Chapter 10

REFERENCE BOOK

1. *Sharma.J.K.* 2007. **Discrete Mathematics**. 2nd Edition. Macmillan India Pvt. Ltd. Newdelhi.

17UMA6EA	ELECTIVE- II: ASTRONOMY - II	SEMESTER - VI

PREAMBLE

1. The students should gain knowledge about Annual Parallax.
2. The students should gain knowledge about Astronomy.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Recall the equation of time and seasons.	**K1**
CO 2	Describe the direct and retrograde motion.	**K2**
CO 3	Classify the different kinds of years and nutation.	**K2**
CO 4	Relate the Eclipses, Ecliptic limits and number of Eclipses in a year.	**K3**
CO 5	Describe the stellar system and identify the	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	M
CO3	S	M	L	S	M
CO4	S	S	M	S	S
CO5	S	M	S	M	S

S-Strong; M-Medium; L-Low

17UMA6EA	ELECTIVE- II: ASTRONOMY - II	SEMESTER - VI

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Time: Equation of time – Siderial Time - Convertion of time – Local Mean Time – Mean Siderial Time - Seasons – Calendar.

UNIT - II

Annual Parallax – Abberation – Direct and Retrograde motion – Stationary points.

UNIT - III

Precession – Precession of the equinoxes on different kinds of years - Nutation.

UNIT - IV

The Moon – Phases of the moon – Eclipses, Ecliptic Limits – Number of Eclipses in a year.

UNIT - V

Planetory Phenomenon – Stellar Universe - The Stellar system – Constellations – Galaxy, Cluster, Nebula – Transit circle.

TEXT BOOK

1. *Kumaravelu and SusheelaKumaravelu,S.* 2007. **ASTRONOMY**. S.Chand and Company Ltd, New Delhi.

17UMA6EB	ELECTIVE- II: NUMERICAL METHODS – II	SEMESTER - VI

PREAMBLE

1. The student gain the knowledge about solving the Ordinary Differential Equations numerically
2. To find differentiation and integration numerically.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Recall numerical differentiation and integration	K1
CO 2	Identify numerical methods to obtain approximate solutions to mathematical problem	K2
CO 3	Acquire knowledge about numerical solutions of Ordinary Differential Equations	K3
CO 4	Construct the numerical methods in modern scientific computing	K3
CO 5	Solve ODE using Milne's and Adam Predictor and Corrector formula.	K3

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	M	S	S	S
CO3	S	S	S	M	S
CO4	S	M	M	S	M
CO5	S	S	S	S	S

S-Strong; M-Medium; L-Low

17UMA6EB	ELECTIVE- II: NUMERICAL METHODS – II	SEMESTER - VI

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Numerical differentiation: Introduction - Newton's forward and backward formulae to compute the derivatives – Derivative using Stirlings formulae –maxima and minima of the function given the tabular values.

UNIT - II

Numerical Integration: Introduction - Newton – Cote's formula – Trapezoidal rule – geometrical interpolation – Truncation error in Trapezoidal rule – Romberg's method - Simpson's one – third rule and Simpson's three – eight rule.

UNIT - III

Difference Equations: Definition - Order and degree of a difference equation –Linear difference equations- To find complementary function and particular integral-solution of homogeneous linear equation.

UNIT -IV

Numerical solution of ODE: Introduction - Taylor series method for first and second order ODE – Picard's method- Euler's method – improved and modified Euler method –RungeKutta method-RungeKutta method for first and second order ODE.

UNIT - V

Numerical solution of O.D.E: predictor – corrector methods - Milne's predictor corrector formulae – Adam-Bashforth predictor corrector formulae.

TEXT BOOK

1. *Kandasamy. P, Thilagavathy. K and Gunavathy. K*.2014.**Numerical Methods**. S. Chand and Company PvtLtd, New Delhi.

   UNIT I : Chapter 9 Section 9.1-9.6

   UNIT II : Chapter 9 Section 9.7-9.14

   UNIT III : Chapter 10 Section 10.1-10.7

   UNIT IV : Chapter 11 Section 11.1-11.15

   UNIT V : Chapter 11 Section 11.16-11.18

REFERENCE BOOKS

1. *Venkataraman, M.K.. 2003..***Numerical Methods in Science and Engineering.**National Publishing Company. Chennai

2.*Arumugam. S, ThangapandiIssac. A, Somasundaram.A,* 2007, **Numerical Methods**. Second Edition, Scitech publications India Pvt.Ltd.

3.*Sastry.S.S,***Introductory Methods of Numerical Analysis**,4th Edition 2006, prentice Hall of India Private Limited, New Delhi.

17UMA6EC	ELECTIVE- II:DIGITAL ELECTRONICS AND COMPUTER FUNDAMENTALS	SEMESTER - VI

PREAMBLE

1. To acquire the basic knowledge of computer fundamentals and application of knowledge to understand digital electronics.
2. To prepare students to perform the analysis and design of various digital electronic.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the fundamental concepts and techniques used in digital electronics.	**K1**
CO 2	Demonstrate various number system, codes, Boolean laws and rules to simplify simple expressions.	**K2**
CO 3	Experiment combinational and sequential circuits.	**K2**
CO 4	Acquired the memory concepts, I/O devices and peripherals.	**K3**
CO 5	Identify and illustrate basic organization of computer	**K3**

Mapping with Programme outcomes

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	M
CO3	S	M	L	S	M
CO4	S	S	M	S	S
CO5	S	M	S	M	S

S-Strong; M-Medium; L-Low

17UMA6EC	ELECTIVE- II:DIGITAL ELECTRONICS AND COMPUTER FUNDAMENTALS	SEMESTER - VI

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Representation of information Number System and Codes – Binary to Decimal Conversion - Decimal to Binary Conversion – Octal Numbers – Hexadecimal Numbers – ASCII Code – Excess-3 Code – Gray Code

UNIT - II

Logic circuits: Gates – AND, OR, NOT, NAND and NOR gates – Truth tables – Boolean Algebra – Karnaugh Maps – Product of sum and Sum of product methods – Don't care conditions – Multiplexers and Demultiplexers – Flip flops – RS, JK, D, T flip flops – Decoders.

UNIT - III

Shift Registers – Counters – Arithmetic circuits – Half adder – Full Adder – Half &fullSubtractor – Binary adder &Subtractor – Serial & Parallel Binary Adders – BCD Adder.

UNIT - IV

I/O devices: Punched tape – Tape readers – Alphanumeric codes – Character recognition – CRT – Output Device: Magnetic tape Output offline Operation – Error detecting and correcting codes – Printers: Dot Matrix, Laser, CRT, Keyboards – Terminals.

UNIT - V

The Memory Element :RA Semiconductor memories -ROM – RAM – Static RAM, Dynamic RAM – Magnetic disc memories – Magnetic tape – Digital recording techniques

TEXT BOOKS

1. *Albert Malvino and Donald P Leach.* 2003. **Digital Principles and Applications** .
2. *Bartee,* T.C . 2007.**Digital Computer fundamentals**, 6th Edition. Tata MC Graw- Hill Edition.

17UMA6ED	ELECTIVE- III:AUTOMATA THEORY AND FORMAL LANGUAGES	SEMESTER - VI

PREAMBLE

1. The student gains the knowledge about formal languages.
2. To know about Automata.

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO1.	Recall the Sets, Relations, Functions, Graph theory, Strings, Languages, Expression and Grammars.	**K1**
CO2.	Understand the concept of finite automata, Regular expression, Context Free Grammar and Push down Automata.	**K2**
CO3.	Construct properties of regular set and minimization of finite automata using MyhillNerode theorem.	**K3**
CO4.	Analyze Context Free Grammars, ambiguous grammars, simplification of CFG'S and Normal forms.	**K3**
CO5.	Identify a fundamental understanding of core concept relating to the Deterministic and Non-deterministic push down automata.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	M	L	S	S
CO4	S	S	M	S	S
CO5	S	M	S	M	S

S-Strong : M-Medium : L-Low

17UMA6ED	ELECTIVE- III:AUTOMATA THEORY AND FORMAL LANGUAGES	SEMESTER - VI

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT - I

Introduction to theory of computation: Symbol and Alphabet-Strings and Languages. **Finite State Machines**: Deterministic Finite Automata (DFA) –Non-Deterministic Finite Automata (NFA)- Equivalence of NFA and DFA-Finite Automata with outputs.

UNIT - II

Regular Expression and Regular Grammars: Regular Expressions-Equivalence of Regular Expression and Finite Automata

UNIT - III

Regular sets and properties: Pumping lemma for Regular sets-Applications of Pumping lemma-Closure properties of Regular sets-Decision algorithms for Regular sets-The Myhill-Nerode theorem and Minimization of finite Automata

UNIT IV

Context Free Language(CFL): Introduction-Context free grammars (CFG)-Derivation Trees-left most derivation and right most derivation-Ambiguity in CFG – simplification of CFG- Normal forms.

UNIT - V

Push Down Automata (PDA): Deterministic Push Down Automata - Non -Deterministic Push Down Automata- Equivalence of acceptance by final state and empty stack-Push Down Automata and CFL's –The Pumping lemma for CFL's- Applications of Pumping lemma- Closure properties of CFL's- decision algorithm for CFL's-Membership.

TEXT BOOK

1. *SaradhiVarma.G.P and ThirupathiRao.B*.2011. **Theory of Computation Formal Languages and Automata Theory**. 8th Edition. SciTech publications(India) Pvt. Ltd.
   UNIT I: Chapters 1 and 2.
   UNIT II: Chapter 3
   UNIT III: Chapter 4
   UNIT IV: Chapter 5
   UNIT V: Chapter 6

REFERENCE BOOKS

1. *John E. Hopcroft and Jeffrey D.Ullman*.1999.**Introduction to Automata theory**,l**anguages and computation**.19th Edition, Narosa Publishing House
2. *John C. Martin,* .2009. **Introduction to languages and the theory of computation. 15th Edition-** Tata Mc Graw-Hill publishing company limited.

17UMA6EE	ELECTIVE –III: FUZZY LOGIC AND NEURAL NETWORKS	SEMESTER - VI

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

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the basic concepts of feed forward neural networks and fuzzy logic.	**K1**
CO 2	Demonstrate the various feedback networks.	**K2**
CO 3	Understand the concept of fuzziness involved in various systems and fuzzy set theory.	**K2**
CO 4	Construct the fuzzy logic control and adaptive fuzzy logic and to design the fuzzy control using genetic algorithm.	**K3**
CO 5	Build the application of fuzzy logic control to real time systems.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	M
CO3	S	M	L	S	M
CO4	S	S	M	S	S
CO5	S	M	S	M	S

S-Strong; M-Medium; L-Low

17UMA6EE	ELECTIVE –III: FUZZY LOGIC AND NEURAL NETWORKS	SEMESTER - VI

Total 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 VijayalakshmiPai, G.A*.2003.**Neural Networks, Fuzzy Logic and Genetic Algorithms – Synthethesis and Applications** . Prentice Hall of India Pvt. Ltd., New Delhi.

REFERENCE BOOK

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

17UMA6EF	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

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

CO Number	CO Statement	Knowledge Level
CO 1	Understand fundamentals of graphs, degree, circuits and trees.	**K1**
CO 2	Illustrate the basic principles of trees, spanning tree and its properties.	**K2**
CO 3	Discuss about circuits, connectivity and planar graphs, manipulate the examples and theorems.	**K2**
CO 4	Abstract thinking of directed and undirected graphs are to be represented by matrices.	**K3**
CO 5	Compute chromatic characteristic and applications of coloring.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	M	M	S
CO2	S	S	M	M	M
CO3	S	M	S	S	M
CO4	S	M	S	S	S
CO5	S	S	S	S	S

S-Strong; M-Medium; L-Low

17UMA6EF	ELECTIVE –III: GRAPH THEORY	SEMESTER - VI

Total Credits:4
Hours Per Week:5

CONTENTS

UNIT- I

Introduction: Graphs-Finite and Infinite graphs- Incidence and Degree-Isolated vertex, Pendent vertex and Null graph. **Paths and circuits**: Isomorphisms - Subgraphs-walk, path and circuits connected graphs, Disconnected graphs and Components- Euler graphs- Hamiltonian paths and circuits – Traveling salesman problem.

UNIT- II

Trees and fundamental circuits : Trees- Properties –pendent vertices in a tree- Rooted and Binary 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: Properties- All Cut- Sets in a graph-Fundamental circuits and cut-sets-Connectivity and Separability. **Planar and dual graphs:** Planar graph- Kuratowski's two graphs.

UNIT-IV

Matrix representation of graphs: Incidence matrix- Sub matrices- Circuit matrix. **Directed graphs:** Directed graph -Types- Directed Paths and Connectedness- Euler Digraphs-Trees with directed edges-fundamental circuits in digraphs- Adjacency Matrices of Diagraphs.

UNIT -V

Coloring, Covering and Partitioning: Chromatic number-chromatic partitioning-chromatic polynomial-matching's-coverings-the four color problem.

TEXT BOOK

1. *NarsinghDeo .1999.***Graph Theory with Applications to Engineering and computer Sceince**, Prentice Hall. New Delhi.

   UNIT I : Chapter 1 Section 1.1 – 1.6
   Chapter 2 Section 2.1 – 2.10

   UNIT II : Chapter 3 Section 3.1 – 3.10

   UNIT III : Chapter 4 Section 4.1 to 4.5
   Chapter 5 Section 5.2 and 5.3

   UNIT IV : Chapter 7 Section 7.1 to 7.3
   Chapter 9 Section 9.1 to 9.7 and 9.9

   UNIT V : Chapter 8 Section 8.1 – 8.6

REFERENCE BOOKS

1. *Arumugam, S and Ramachandran S* .2001.**Invitation to Graph Theory** by*Scitech*Publications.
2. *Harary*. 2001. **Graph Theory** .Narosa Publishing House Pvt. Ltd.New Delhi.

17UNM34B	NMEC–I :MATHEMATICS FOR COMPETITIVE EXAMINATIONS - I	SEMESTER - III

Total Credits:2
Hours Per Week:2

CONTENTS

UNIT - I

Numbers – H.C.F and L.C.M of numbers – Problems on numbers.

UNIT - II

Average – Problems on Ages – Percentage.

UNIT - III

Profit and Loss – Ratio and Proportion – Partnership.

UNIT - IV

Time and work – Pipes and Cistern – Time and distance.

UNIT - V

Calendar – Clocks - Heights and distances.

TEXT BOOK

1. Agarwal , R.S.2015 .**Quantitative Aptitude.** Seventh Revised Edition S. Chand and Company Ltd, New Delhi.

UNIT I : Chapter 1 , 2, 7

UNIT II : Chapter 6, 8, 10

UNIT III : Chapter 11, 12, 13

UNIT IV : Chapter 15, 16, 17

UNIT V : Chapter 27, 28, 34

REFERENCE BOOKS

1. *Abhijit Guha*. 2004.**Quantitative Techniques**. S. Chand and Company Ltd, New Delhi.
2. *Praveen, R.V*. 2013. **Quantitative Aptitude and Reasoning.** PHI learning Pvt Ltd, New Delhi.

17UNM44B	NMEC-II: MATHEMATICS FOR COMPETITIVE EXAMINATIONS - II	SEMESTER– IV

Total Credits:2
Hours Per Week:2

CONTENTS

UNIT - I

Problems on Trains - Boats and streams .

UNIT - II

Alligation or mixture – Simple interest – Compound interest.

UNIT - III

Volume and Surface Areas : Cube – Cuboids – Sphere - Semi Sphere – Cone – Cylinder.

UNIT - IV

Permutation and Combination – Probability – Odd man out and series.

UNIT -V

Data Interpretation : Tabulation – Bar graphs – Pie charts – Line graphs.

TEXT BOOK

1. Agarwal , R.S.2015 .**Quantitative Aptitude.** Seventh Revised Edition S. Chand and Company Ltd, New Delhi.

UNIT I : Chapter 18, 19

UNIT II : Chapter 20, 21, 22

UNIT III : Chapter 25

UNIT IV : Chapter 30, 31, 35

UNIT V : Chapter 36, 37, 38, 39

REFERENCE BOOKS

1. *Abhijit Guha*. 2004.**Quantitative Techniques**. S. Chand and Company Ltd, New Delhi.
2. *Praveen, R.V.* 2013. **Quantitative Aptitude and Reasoning.** PHI learning Pvt Ltd, New Delhi.

17UMASS1	SELF STUDY PAPER – I VEDIC MATHEMATICS	SEMESTER - III

PREAMBLE

1. To enable students gain fundamental knowledge about the Vedic Mathematics and its calculations

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Observe mathematical concepts and examine the subtraction and multiplication using simple	**K1**
CO 2	Illustrate the basic method of sum and product of two numbers	**K2**
CO 3	Manipulate the multiplication with eleven	**K3**
CO 4	Construct the secondary basis of 50 and 500	**K3**
CO 5	Practice the two digits and three digits multiplication.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	M
CO3	S	M	L	S	M
CO4	S	S	M	S	S
CO5	S	M	S	M	S

S-Strong; M-Medium; L-Low

17UMASS1	SELF STUDY PAPER – I VEDIC MATHEMATICS	SEMESTER III

Total Credit: 1

CONTENTS

UNIT-I

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

UNIT-II

Operations with 9: Computation of 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 111.

UNIT – IV

Multiplication (Nikhilam) : Secondary Bases of 50 – Secondary Bases of 500

UNIT – V

(Multiplication (UrdhaTiryak): 2 Digit Multiplication - 3Digit multiplication

TEXT BOOK

1. AtulCupta, The Power of Vedic maths, 2005, Jaico Publishing House Mumbai.

17UMASS2	SELF STUDY PAPER – II HISTORY OF MATHEMATICS	SEMESTER – III

PREAMBLE

1. To enable students gain knowledge about historical perspectives
2. To know about the international dimension of mathematics

COURSE OUTCOMES

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

CO Number	CO Statement	Knowledge Level
CO 1	Learn the significance of the history of mathematics.	**K1**
CO 2	Demonstrate understanding of the concepts of numbers, number systems, representations of numbers, techniques and methods	**K2**
CO 3	Demonstrate the deeply interconnected nature of mathematics and excellent communications skills in mathematics.	**K2**
CO 4	Build the significance of mathematical models over the course of mathematics history	**K3**
CO 5	Acquire the significance and nature of axiomatic reasoning and ability to read and discuss mathematical proofs.	**K3**

MAPPING WITH PROGRAMME OUTCOMES

COS/POS	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	M	S
CO2	S	S	S	S	M
CO3	S	M	L	S	M
CO4	S	S	M	S	S
CO5	S	M	S	M	S

S-Strong; M-Medium; L-Low

17UMASS2	SELF STUDY PAPER – II HISTORY OF MATHEMATICS	SEMESTER – III

Total Credit: 1

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.

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

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- V

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.

TEXT BOOK

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

   UNIT I : Chapter 1, 2, 3

   UNIT II : Chapter 5, 6 and 7

   UNIT III: Chapter 8 and 9

   UNIT IV: Chapter 14 and 15

   UNIT V : Chapter 16

REFERENCE BOOK

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

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