

Vellalar College for Women (Autonomous), Erode - 12.

Bachelor of Science in Mathematics with Computer Applications

2015 - 2016 Onwards

Course Content and Scheme of Examinations (CBCS Pattern)

Semester I

Part	Study Component	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits
						CIA	ESE	Total	
I	Language - I	15TAMU101/ 14HINU101	Tamil / Hindi	6	3	25	75	100	3
II	Language - II	13ENHU101 / 13ENLU101	English	6	3	25	75	100	3
III	Core	10MCUC101/ 10MSUC101	Classical Algebra ©	4	3	25	75	100	4
		15MSUC102 / 15MCUC102	Differential Calculus ©	5	3	25	75	100	4
	Allied – I	15MCUA101	Statistics for Mathematics - I **	7	3	25	75	100	5
IV	Foundation Course	09FOCU1ES	Environmental Studies	2	3	-	100	100	2
Total								600	21

Semester II

I	Language - I	15TAMU202/ 14HINU202	Tamil / Hindi	6	3	25	75	100	3
II	Language - II	13ENHU202 / 13ENLU202	English	6	3	25	75	100	3
III	Core	15MSUC203 / 15MCUC203	Integral Calculus ©	4	3	25	75	100	4
		15MCUC204	Trigonometry and Vector Calculus	5	3	25	75	100	4
	Allied – I	13MSUA202 / 13MCUA202	Statistics for Mathematics - II ©	7	3	25	75	100	5
IV	Value Education	14VEDU2HR	Value Education and Human Rights	2	3	-	100	100	2
Total								600	21

© Common for both B.Sc Mathematics and B.Sc Mathematics (CA)

** 13MCUA101 / 15MCUA101 - Same Syllabus only marks & credits are changed

Semester III

Part	Study Component	Subject Code	Title of the Paper	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits	
						CIA	ESE	Total		
III	Core	15MSUC407 / 15MCUC305	Transforms & Fourier Series ©	3	3	25	75	100	4	
		15MSUC510 / 15MCUC306	Complex Analysis - I ©	5	3	25	75	100	4	
		10MCUC307	Mechanics	4	3	25	75	100	4	
		08MCUC308	C - Programming Theory	3	3	25	75	100	2	4
		15MCUCP01	C - Programming Practical	3	3	40	60	100	2	
	Allied – II	10PHUA001	Physics - I Theory	5	3	20	55	75	4	
10PHUAP01	Physics - I Practical	2	-	-	-	-				
IV	Skill Based Subject - I	11MCUS301	Documentation Package - LATEX (Theory)	2	3	25	75	100	3	
			Practical	1	-	-	-	-		
	Basic Tamil			2	-	100	-	100	2	
	Advanced Tamil				3	25	75			
Non Major Elective - I	09MCUN301	Fundamentals of Mathematics	3		-	100				
Total								775	25	
Semester IV										
III	Core	15MSUC614 / 15MCUC409	Complex Analysis - II ©	5	3	25	75	100	4	
		08MCUC410	Object Oriented Programming with C++ (Theory)	4	3	25	75	100	2	4
		15MCUCP02	Object Oriented Programming with C++ (Practical)	3	3	40	60	100	2	
		15MCUC411	Analytical Geometry **	6	3	25	75	100	5	
	Allied – II	10PHUA002	Physics - II Theory	5	3	20	55	75	4	6
		10PHUAP01	Physics - II Practical	2	3	20	30	50	2	
IV	Skill Based Subject - II	15MCUS402	Multiskill Development Paper * ©	3	1	40	60	100	3	
	Basic Tamil			2	-	100	-	100	2	
	Advanced Tamil				3	25	75			
	Non Major Elective - II	09MCUN402	Industrial Mathematics		3	-	100			
Total								725	24	

* Online Examination

** 10MCUC411 / 15MCUC411 - Same Syllabus only credits are changed

Semester V

Part	Study Component	Subject Code	Paper Title	Inst. Hrs./ Week	Exam. Dur. Hrs.	Max. Marks			Credits	
						CIA	ESE	Total		
III	Core	15MSUC509/ 15MCUC512	Real Analysis - I©	6	3	25	75	100	3	
		09MSUC511/08MCUC513	Modern Algebra - I©	6	3	25	75	100	4	
		08MCUC514	Visual Basic Theory	3	3	20	55	75	3	5
		15MCUCP03	Visual Basic Practical	2	3	10	15	25	2	
	15MCUC515	Operations Research **	5	3	25	75	100	5		
Elective - I	11MCUE501	Numerical Methods	5	3	25	75	100	5		
IV	Skill Based Subject - III	11MCUS503	Mathematics for Competitive Examinations	3	3	25	75	100	3	
Total								600	25	
Semester VI										
III	Core	15MSUC613/15MCUC616	Real Analysis - II ©	6	3	25	75	100	4	
		15MSUC615/15MCUC617	Modern Algebra -II©	6	3	25	75	100	4	
		10MCUC618	Internet & Java Programming Theory	4	3	20	55	75	3	4
		15MCUCP04	Internet & Java Programming Practical	3	3	-	25	25	1	
	15MCUCP05	Practical : SPSS, MATLAB & Microsoft Math 3.0	3	3	40	60	100	3		
Elective - II	11MCUE602	Optimization Techniques	5	3	25	75	100	5		
IV	Skill Based Subject - IV	11MCUS604	Discrete Mathematics	3	3	25	75	100	3	
V	Extension Activity		NCC / NSS / Physical Education/YRC/Green Society/Citizen Consumer Club(CCC)/ Entrepreneurship Development Programme(EDP)	-	-	-	-	100	1	
Total								700	24	
Total (I - VI Semesters)								4000	140	

© Common for both B.Sc Mathematics and B.Sc Mathematics (CA)

** 11MCUC515 / 15MCUC515 - Same Syllabus only credits and marks are changed.

SKILL BASED SUBJECTS

S.NO	Subject Code	Title of the Paper			
1	11MCUS301	Documentation Package - LATEX (Cafeteria System)			
2	15MCUS402	Multiskill Development Paper (Online exam - Ext : 60)			
3	11MCUS503	Mathematics for Competitive Examinations (Cafeteria System)			
4	11MCUS604	Discrete Mathematics (Cafeteria System)			
BASIC TAMIL/ADVANCED TAMIL/ NON-MAJOR ELECTIVES					
1	14TMLU301	Basic Tamil *			
	14TMLU402				
2	14ADTU301	Advanced Tamil **			
	14ADTU402				
3	09MCUN301	Fundamentals of Mathematics			
	09MCUN402	Industrial Mathematics			
© Common for both B.Sc Mathematics and B.Sc Mathematics (CA) * For Students whose Part I in Secondary education is not Tamil ** For Students whose Part I in Higher Secondary education is not Tamil					
SELF LEARNING PAPERS (OPTIONAL)					
S. No.	Subject Code	Title of the Paper	Exam.Dur.Hrs	Max.Marks	Credits
1	13AUGSL05	General Awareness [Online Examination]	3	100	5
2	15MCUSL03	Vedic Mathematics -II	3	100	5

SEMESTER - I

CORE PAPER - I

CLASSICAL ALGEBRA

Instructional Hrs.: 60

Sub.Code:10MSUC101/10MCUC101

Max. Marks: CIA – 25; ESE – 75

Credits: 4

Objective: In this course, students are exposed to topics like Summation of Series, Convergence and Divergence and Theory of Equations. The stress is on the development of problem solving skills.

UNIT I

12 Hrs.

Binomial and Exponential Series: Theorems – Statements and Proofs – Their Immediate Application to Summation and *Approximation* Only.

UNIT II

12 Hrs.

Logarithmic Series: Theorem – Statement and Proof – Immediate Application to Summation and Approximation only - Convergency and Divergency of Series – Definitions, Elementary results – *Comparison Tests* – De Alembert's and Cauchy's Tests.

UNIT III

12 Hrs.

Absolute Convergence: Series of Positive terms – Cauchy's Condensation Test – *Raabe's Test*.

UNIT IV

12 Hrs.

Theory of Equations: Roots of an Equation – Relations Connecting the Roots and Coefficients - Transformations of Equations – Character and Position of Roots – Descarte’s Rule of Signs – Symmetric Function of Roots – *Reciprocal Equations*.

UNIT V

12 Hrs.

Theory of Equations: Multiple Roots – Rolle’s Theorem – Position of Real Roots of $f(x) = 0$ - Newton’s Method of Approximation for Finding Positive Roots upto Two Decimal Places – *Horner’s Method upto Two Decimal Places*.

Note: *Italics* denote Self Study Topics

TEXT BOOK

1. **T.Natarajan, T.K. Manicavachagom Pillay** and **K.S.Ganapathy**, *Algebra*, S.Viswanathan Printers and Publishers Pvt., Reprint, 2012-2013.

REFERENCE BOOKS

1. **Anadha Padanadha S Nadar** and **T.V. Laxmi Narasimhan**, *Algebra*, Rachouse & Sons 1st Edition, 1972
2. **P.N.Chatterjee**, *Algebra*, Rajhans Agencies, 13th Edition, 1990.
3. **M.K.Singal** and **Asha Rani Singal**, *Algebra*, R.Chand & Co., 12th Edition, 1982.

- Question paper setters are asked to confine to the above **text book** only.

SEMESTER - I

CORE PAPER - II

DIFFERENTIAL CALCULUS

Instructional Hrs. :75

Sub. Code: 15MSUC102/ 15MCUC102

Max. Marks: CIA – 25; ESE – 75

Credits: 4

Objective:

The course aims to provide logical skills in the curvature and the formation of differential equations, to expose to different techniques of finding solutions to these equations. In addition stress is laid on the applications of these equations in Geometrical and Physical Problems.

UNIT I

15 Hrs.

Curvature: Radius of curvature in Cartesian and *polar forms* – Evolutes and Involutives – Envelopes – Singularities – Multiple Points.

UNIT II

15 Hrs.

Curvature: Pedal Equations – *Total Differentiation* – Euler's Theorem on Homogeneous Functions.

UNIT III

15 Hrs.

Differentiation: Particular Integral of Equations of Second Order with Constant Co-efficient for $x e^{mx}$ - Higher Order Equations when F(D) is easily Factorizable - Linear equations with Variable Co-efficients (Reducible to Quadratic form).

UNIT IV

15 Hrs.

Ordinary Differential equations: First Order Higher Degree Equations - Solvable for x, y, p - Clairaut's form- Simultaneous Differential Equations of the form (i) $f_1(D)x + f_1(D)y = f_1(t)$, $g_1(D)x + g_2(D)y = f_2(t)$ where f_1, f_2, g_1 and g_2 are rational functions of $D = \frac{d}{dt}$ with constant coefficients f_1 and f_2 are Explicit functions of t . $\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$, Conditions of Integrability.

UNIT V

15 Hrs.

Partial Differential Equations: Formation of Equations by Eliminating Arbitrary Constants and Arbitrary Functions. Definitions of General, Particular and Complete solutions – Singular and General Solutions of First Order Equations in the Standard Forms (i) $f(p, q) = 0$, (ii) $f(z, p, q) = 0$, (iii) $f(x, p) = g(y, q)$, (iv) $z = px + qy + f(p, q)$. Lagrange's Method of Solving Linear Differential Equations $Pp + Qq = R$.

Note: *Italics denote Self Study Topics*

TEXT BOOKS

1. **S Narayanan** and **T.K.Manicavachakam Pillay**, *Calculus*, Vol I, S.Viswanathan Printers and Publishers Pvt. Ltd., Chennai, Reprint 2012 - 2013. (Units 1, 2)
2. **S Narayanan** and **T.K.Manicavachakam Pillay**, *Calculus*, Vol III, S.Viswanathan Printers and Publishers Pvt. Ltd., Chennai, Reprint 2012 - 2013. (Units 3,4,5)

REFERENCE BOOKS

1. **David.V.Widder**, *Advanced Calculus*, Prentice Hall of India Pvt. Ltd., New Delhi. 2nd Edition, 1961.
2. **S.Sudha**, *Differential Equations and Integral Transforms*, Emerald Publishers, Chennai, 2003.

- Question paper setters are asked to confine to the above **text book** only

SEMESTER I
ALLIED – I : PAPER – I
STATISTICS FOR MATHEMATICS – I

Instructional Hrs. : 105

Sub.code : 15MCUA101

Max.Marks : CIA – 25 ; ESE – 75

Credits : 5

Objective :

- To study about the random variables.
- The students will be able to apply statistical tools in real-life problems as well as research problems.
- The contents of this paper is a prerequisite for learning SPSS package.

UNIT I

21 Hrs.

Random Variables : Random Variable - Cumulative Distribution Function - Continuous Random Variable - Two Dimensional Random Variable - Marginal Probability Distribution - Conditional Probability Distribution – Independent Random Variables.

UNIT II

21 Hrs.

Characteristics of Distributions: Expectation or Mean Value – Function of a Random Variable – Properties of Expected Values. Variability (or dispersion) – Properties of Variance – Sample Mean and Sample Variance – Mean and Standard Deviation of the Combination of two Samples – Frequency Table – Tchebechev's Inequality.

UNIT III

21Hrs.

Characteristics of Distribution: Moments – Moment Generating Function – Measures of Dispersion – Skewness – Kurtosis – Covariance – Correlation – Sample Correlation Coefficient – Correlation for a grouped data – Rank Correlation.

UNIT IV**21Hrs.**

Least Squares and Regression Analysis: Curve Fitting – Principle of Least Square – Fitting a Straight Line – Fitting a Second Degree Polynomial – To Fit a Curve of the form $y=ae^{bx}$, $y=ab^x$ $y=ax^b$ – Regression of First Kind – Regression of Second Kind – Scatter Diagram – Lines of Regression – Regression line of Y on X – Properties of Regression Coefficient – Angle between the Regression Lines.

UNIT V**21Hrs.**

Discrete Distributions & Continuous Distributions: Binomial Distribution - Poisson Distribution – Continuous Distribution: Normal Distribution.

Note: *Italics* denotes Self Study Topics

TEXT BOOK:

- 1 S.Venkataraman, P.R.Vittal., Mathematical Statistics.

Unit	Chapter	Section	Page
I	2	2.1, 2.2, 2.3, 2.5, 2.6, 2.7, 2.8	39-79
II	3	3.1, 3.2, 3.3, 3.4 to 3.8	73-110
III	3	3.8 to 3.19(except 3.11)	111 – 121 &131 - 157
IV	11	11.1 to 11.4, 11.7 to 11.14	379 to 405
V	4 & 5	4.1, 4.2, 5.1	163 - 198 &203 - 229

- Question Paper setters are asked to confine to the above **text book only**.

SEMESTER - II
CORE PAPER – III
INTEGRAL CALCULUS

Instructional Hrs. : 60

Sub.Code:15MSUC203/15MCUC203

Max. Marks: CIA – 25; ESE – 75

Credits: 4

Objective: On successful completion of course the students should gain knowledge about the evolutes and envelopes, different types of Integrations, its geometrical application, proper and improper integration.

UNIT I

12 Hrs.

Integration: Integration of the types $f'(x)/f(x)$, $dx/ax^2 + bx + c$, $lx + m/(ax^2 + bx + c)$, $(px + q)/\sqrt{ax^2 + bx + c}$, $\sqrt{(x - \alpha)(\beta - x)}$, $\sqrt{(x - \alpha)/(\beta - x)}$, $1/\sqrt{(x - \alpha)(\beta - x)}$, $\frac{1}{a \cos x + b}$ or $\frac{1}{a \sin x + b}$ and $\frac{1}{(a^2 \cos^2 x + b^2 \sin^2 x)}$ - *Integration by parts.*

UNIT II

12 Hrs.

Reduction formulae: Reduction formulae - Problems – Bernoulli's formula – Problems.

UNIT III

12 Hrs.

Multiple Integrals: Evaluation of Double and Triple Integrals – Applications to Calculation of Areas and Volumes.

UNIT IV

12 Hrs.

Multiple Integrals: Change of Order of Integration in Double Integrals – *Jacobians* – Change of Variables in Double and Triple Integrals.

UNIT V

12 Hrs.

Improper Integrals: Notion of Improper Integrals - Their Convergence - Simple Tests for Convergence - Simple Problems - Beta and Gamma Integrals – Their Properties - Relation between them – *Evaluation of Multiple Integrals using Beta and Gamma Functions.*

Note: *Italics* denote Self Study Topics

TEXT BOOKS

1. **S Narayanan** and **T.K .Manicavachakam Pillay**, *Calculus*, Vol. II, S. Viswanathan Printers and Publishers Pvt. Ltd., Chennai, 2006.

REFERENCE BOOKS

1. **Khail Ahmad**, *Text book of Integral Calculus and Differential Equations*, Anamaya Publishers, New Delhi, 2005.
2. **K.R.Rajagopalan**, **N.Seshadri** and **G.Shanmugasundaram**, *Text book of Calculus*, S.Chand and Company Ltd., New Delhi, 1982.
3. **P.R.Vittal** and **V.Malini**, *Calculus*, Margham Publications, 2nd Edition, 1998.

- Question paper setters are asked to confine to the above **text book** only

SEMESTER - II
CORE PAPER - IV
TRIGONOMETRY AND VECTOR CALCULUS

Instructional Hrs. 75

Sub. Code: 15MSUC204/ 15MCUC204

Max. Marks: CIA -20; ESE -55

Credits: 4

Objective: This paper deals with expansion of trigonometric functions, line integral, surface integral and volume integral.

UNIT I

15 Hrs.

Expansions and Hyperbolic Functions: Expansion of $\cos n\phi$, $\sin n\phi$, $\cos^n \phi$, $\sin^n \phi$ -
Hyperbolic functions – Separations of real and imaginary parts of $\sin(\alpha + i\beta)$,

$\cos(\alpha + i\beta)$, $\tan(\alpha + i\beta)$, $\sinh(\alpha + i\beta)$, $\cosh(\alpha + i\beta)$, $\tanh(\alpha + i\beta)$, $\tan^{-1}(\alpha + i\beta)$.

UNIT II

15 Hrs.

Logarithm of a complex number and Summation of Series: Logarithm of a complex number
– Summation of trigonometric Series – *When angles are in A.P. - method of Differences.*

UNIT III

15 Hrs.

Differentiation of Scalar and Vector Point Functions: Scalar and Vector functions – Level Surfaces – Directional derivative of a Scalar Point function - -Gradient of a Scalar Point function – Summation notation for gradient – Gradient of $f(r)$ – Divergence and curl of a vector point function – Summation notation for divergence and curl – Laplacian differential operator – Other differential operators – Divergence and curl of a gradient – *Divergence and curl of a curl* – Examples.

UNIT IV

15 Hrs.

Integration of Scalar and Vector Point Functions: Line integrals – Independence of path of integration – Conservative field and scalar potential – *Line integral of a conservative vector* – Surface integrals – Volume integrals – Cylindrical and Spherical polar coordinates – Examples.

UNIT V

15 Hrs.

Integral Theorems: Integral theorems – Gauss' Divergence theorem – Integral theorems derived from the Divergence theorem – Green's theorem in plane – Stoke's theorem – Integral theorems derived from Stoke's theorem – *Operational meanings of $\nabla, \nabla \cdot, \nabla \times$ in terms of surface integrals* – Examples.

Note: *Italics* denote Self Study Topics

TEXT BOOKS

1. **P. Duraipandian, Kayal Pachaiappa**, *Vector Analysis*, S.Chand &Co., 1st Edition 2014.
2. **S. Narayanan and T.K.Manicavachagam Pillay**, *Calculus*, Vol. III, S. Viswanathan Publishers, 18th Edition 2002.
3. **S.Narayanan and T.K .Manicavachagam Pillay.**, *Trigonometry*, S. Viswanathan Publishers, 2004.

REFERENCE BOOKS

1. **M.L.Khanna**, *Trigonometry*, Jai Prakash Nath & Co., Educational Publisher, 14th Edition 1993.
2. **M.D.Raisinghania, H.C.Saxena, H.K.Dass**, *Simplified Course in Trigonometry*, S.Chand and Company Ltd., 1st Edition 1999.
3. **M.D. Raisinghania**, *Vector Calculus*, S.Chand and Company Ltd., 3rd Edition, 1997.

- Question paper setters are asked to confine to the above **text books** only.

SEMESTER II
ALLIED – I: PAPER – II
STATISTICS FOR MATHEMATICS – II

Instructional Hrs.: 105

Sub. code: 13MSUA202/13MCUA202

Max.Marks: CIA – 25 ; ESE – 75

Credits : 5

Objective:

- To study about the Sampling Distribution.
- The students will be able to apply statistical tools in real-life problems as well as research problems.
- The contents of this paper is a prerequisite for learning SPSS package.

UNIT I

21 Hrs.

Sampling Distribution: χ^2 Distribution – Students t Distribution – Snedecor's F Distribution – Sampling Distributions of *Mean* and Variance in Samples from a Normal Distribution.

UNIT II

21 Hrs.

Theory of Estimation: Introduction – Properties of Good Estimators – *Method of Moments* – Principal of Maximum likelihood.

UNIT III**21 Hrs.**

Testing Hypotheses and Tests of Significance: General Method of Testing Hypothesis – Test of Significance based on the *normal*, t and F Distribution – Small Samples – Significance of the difference between the variances of two Samples.

UNIT IV**21 Hrs.**

Tests of Goodness of Fit: The Chi-Square Test of Hypothesis – Chi-Square Test of Goodness of Fit – *Application to contingency Tables.*

UNIT V**21Hrs.**

Sampling from finite Populations: Random Sampling – Methods of Selection of a Random Sample – Estimates of the Mean and Variance of the Mean in Simple Random Sampling – Stratified Random Sampling – *Optimum Allocation* – Systematic Samples.

Note: *Italic denotes Self Study Topics.*

TEXT BOOKS

1. **S.Venkataraman, P.R.Vittal, *Mathematical Statistics*, 1973.**

Unit	Chapter	Section	Page
I	6	6.4, 6.5, 6.6, 6.7	258 - 281
II	7	7.1 to 7.4	291 - 312
III	9	9.1 to 9.4	328 - 357
IV	10	10.1, 10.2	358 - 378
V	12	12.1 to 12.6	406 - 431

- Question Paper setters are asked to confine to the above **text book** only.

SEMESTER – III

CORE PAPER - V

TRANSFORMS AND FOUIER SERIES

Instructional Hrs: 45

Sub. Code: 15MSUC407 / 15MCUC305

Max. Marks: CIA – 25; ESE – 75

Credits: 4

Objective: In addition to Laplace Transforms, Also, stress is laid on the applications of the differential equations in geometrical and physical problems. Also, this paper deals with expansion of Fourier series, Fourier Transform and Z – Transforms.

UNIT I

9 Hrs.

Laplace transforms: Introduction – Definition – Transforms of elementary functions – properties of Laplace transforms – Transforms of periodic functions – Transforms of special functions – Transforms of derivatives – *Transforms of integrals* – Multiplication by t^n – Division by t – Evaluation of integrals by Laplace Transforms.

UNIT II

9 Hrs.

Inverse Laplace transforms: Inverse Laplace transforms – Method of partial fractions – Other methods of finding inverse transforms – Convolution theorem – Application of differential equations – *Simultaneous linear equations with constant coefficients* – Unit step function – Unit impulse function.

UNIT III

9 Hrs.

Fourier transforms: Introduction – Definition – Fourier integral theorem – Properties of F – transforms – Convolution– Parseval's identity for F – transform – *Relation between Fourier and Laplace Transform* – Fourier Transforms of the derivatives of a function – Inverse Laplace transforms by method of residue – Application of transforms to boundary value problems .

UNIT IV**9 Hrs.**

Z – transforms : Introduction – Definition – Some standard Z–transforms – Linearity property – Damping rule – Some standard results – Shifting U_n to the right – Multiplication by n – Two basic theorems – *Some useful Z–transforms* – *Some useful inverse Z– transforms* – Convolution theorems – Convergence of Z–transforms – Two – sided Z–transform – Evaluation of inverse Z–transforms – Applications to difference equations.

UNIT V**9 Hrs.**

Fourier series: Introduction – Euler’s formulae – Conditions for a Fourier expansion – Functions having point of discontinuity – Change of interval – Odd and even functions– Half – range series – Typical wave – forms – Parseval’s formula – Complex form of F – Series – *Practical Harmonic Analysis*.

TEXT BOOK

1. **B.S.Grewal** , *Higher Engineering Mathematics*, Khanna Publishers, 43rd Edition, 2014.

Unit	Chapter(s)	Section(s)
I	21	21.1 – 21.11
II	21	21.12 – 21.17
III	22	22.1 – 22.11
IV	23	23.1 – 23.16
V	10	10.1 – 10.11

REFERENCE BOOKS

1. **S.Narayanan and T.K.Manicavachagom Pillay**, *Calculus*, Vol III , S.Viswanathan Printers & Publishers Pvt. Ltd., Chennai, Reprint 2012 – 2013.
 - Question paper setters are asked to confine to the above **text book** only.

SEMESTER-III

CORE PAPER - VI

COMPLEX ANALYSIS – I

Instructional Hrs: 75

Sub.Code:15MSUC510/ 15MCUC306

Max. Marks: CIA - 25; ESE - 75

Credits: 4

Objective: On successful completion of this course the students will gain

knowledge about complex number system, complex functions, power series, Conjugate harmonic function, complex integration and will develop problem solving skill.

UNIT I

15 Hrs.

Complex Number System: Complex Number – Field of Complex Numbers – Conjugation – *Absolute Value of a Complex Number* - Inequalities in terms of Moduli.

Complex Plane: Representation of Complex Number – Angle between Two Rays – Equations of Straight Lines and Circles – Elementary Transformations

$$(i)w = z + d \quad (ii)w = az \quad (iii)w = \frac{1}{z}$$

Definition of Extended Complex Plane – Stereographic Projection - fixed points. Invariance of Cross – Ratio under Bilinear Transformation – Circles and Inverse Point - Examples (only problems in the above topics).

UNIT II

15 Hrs.

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 – Cauchy – Riemann Equation in Polar Coordinates - Complex Function as a Function of z and \bar{z} - Examples (only problems in the above topics).

UNIT III

15 Hrs.

Power Series: Power Series - Absolute Convergence of a Power Series – Circle of Convergence (Term by Term Differentiation of a Series).

Elementary Functions: Exponential, Logarithmic, *Trigonometric and Hyperbolic Functions* – Examples (only problems in the above topics)

UNIT IV

15 Hrs.

Harmonic Function: Definition and Determination. Conformal Mapping: Isogonal Mapping – Conformal Mapping $z \rightarrow f(z)$ where f is Analytic. Particularly the Mapping $w = z + \frac{1}{z}$, $w = e^z$; $w = \cos z$ - Examples (only problems in the above topics).

UNIT V

15 Hrs.

Complex Integration: Simply and Multiply Connected Regions in the Complex Plane. Integration of $f(z)$ from Definition Along a Curve Joining z_1 and z_2 - Proof of Cauchy's Theorem (using Goursat's Lemma for a Simply Connected Region) - Cauchy's Integral Formula for Higher Derivatives (Statement Only) – *Morera's Theorem* - Examples (only problems in the above topics)

Note: *Italics denote Self Study Topics*

TEXT BOOK

1. **P.Duraipandian ., Kayalal Pachaiyappa, *Complex Analysis*, S.Chand, NewDelhi, 2014.**

Unit	Chapter	Sections
I	1	1.1, 1.2, 1.6 - 1.9. (only Examples in 1.1, 1.2, 1.6 to 1.8)
	2	2.1, 2.4 - 2.10 (only Examples in 2.1, 2.4 - 2.9)
	7	7.1, 7.3, 7.10. (only Examples in 7.1, 7.3)
II	4	4.1 - 4.10. (only Examples in 4.1 - 4.9)
III	6	6.1 - 6.11, 6.13(only Examples in 6.1 - 6.11)
IV	6	6.12, 6.13(only Examples in 6.12)
	7	7.6 - 7.10. (only Examples in 7.6 - 7.9)
V	8	8.6 - 8.9, 8.13(only Examples in 8.6 - 8.9)

REFRENCE BOOKS

1. **Ahlfors V Lars**, *Complex Analysis*, MCGraw-Hill International Book Company, 3rd Edition, 1979.
 2. **S.Arumugam, A.Thangapandi Issac and A.Somasundram**, *Complex Analysis*, New Gamma Publishing House, Palayamkottai, 1999.
 3. **V.Karunakaran**, *Complex Analysis*, Narosa Publishing House, 2nd Edititon, 2005.
- Question paper setters are asked to confine to the above **text book** only.

SEMESTER - III
Core Paper -VII
MECHANICS

Instruction Hrs:60

Sub.Code:10MCUC307

Max. Marks: CIA – 25; ESE – 75

Credits: 4

Objective:

- To Study about the Type of Forces, Kinematics, Projectile.
- The Students will be able to Work on Physical Problems in Real Life.
- The Contents of this Paper is a Prerequisite for Learning Physical Problems.

UNIT I

12 Hrs

Forces Acting at a Point: Parallelogram Law – Triangle Law – $(\lambda - \mu)$ Theorem – Polygon of Forces – *Conditions of Equilibrium*.

UNIT II

12 Hrs

Parallel Forces, Moments and Couples: Composition of Parallel Force (Like and Unlike) Moment of a Force about a Point and about a Line – *Varignon's Theorem*.

UNIT III

12 Hrs

Coplanar Forces Acting on a Rigid Body : Theorem on Three Coplanar Forces in Equilibrium- Reduction of a System of Coplanar Forces to a Single Force and a Couple - Conditions of Equilibrium – Forces in Three Dimensions – Invariances – *Wrench Pitch and Equation of Central Axis*.

UNIT IV

12 Hrs

Kinematics: Velocity – Acceleration. Composition of Velocities and Accelerations – Relative Velocity - Angular Velocity – Relative Angular Velocity. **Motion of a Straight Line:** Equations

of Motion, Acceleration of Falling Bodies – *Vertical Motion under Gravity* – Motion down a Smooth Inclined Plane.

UNIT V

12 Hrs

Projectile: Path of a Projectile – Greatest Height – Time of Flight – Range on an Inclined Plane through the Point of Projection – *Maximum Range on the inclined plane-down the plane.*

Note: *Italics denotes Self Study Topics*

TEXT BOOKS

1. Venkataraman M.K., *Statics*, Agasthiar Publications, Trichy, 10th Edition, 2002.
2. Venkataraman M.K., *Dynamics*, , Agasthiar Publications, Trichy, 11th Edition, 2004.

REFERENCE BOOKS

1. Manickavachagam Pillai T.K., *Statics*, The National Publishing Company, 3rd Edition, 1978.
2. Narayanan S., *Dynamics*, S.Chand & Company Ltd., 4th Edition, 1980.
3. Ray M., *A Text Book On Dynamics*, S.Chand and Company, 8th Edition, 1972.

- Question paper setters confine to the above text books only.

SEMESTER - III
Core Paper - VIII
C- PROGRAMMING (THEORY)

Instructional Hrs: 45

Sub.Code: 08MCUC308

Max. Marks: CIA – 25; ESE – 75

Credits: 2

Objective:

- The Aim of this Course is to develop the Programming Skill in the Computer Language C.
- This Enhance the Job Opportunities to the Student in the IT Field.

UNIT I

9 Hrs

Constant, Variables, Data Types and Operators : Introduction – Character Set – C Tokens – Keywords & Identifiers – Constants – Variables – Data types – Declaration of Variables and Storage Class – Symbolic Constants. **Operators:** Arithmetic, Relational, Logic, Assignment, Increment and Decrement, Conditional, Bitwise and Special Operators – *Arithmetic Expression* – Precedence of Operators – Type Conversions – Mathematical Functions.

UNIT II

9 Hrs

Looping and Branching: IF Statement - IF...ELSE Statement – Nesting of IF...ELSE Statement – ELSE IF Ladder- SWITCH Statement - ?: Operator – GO TO Statement – WHILE Loop – DO...WHILE Loop – *FOR Loop* – Jumps in Loop.

UNIT III

9 Hrs

Formatted I/O Operations: Reading and Writing a Character – Formatted Input and Output. **Arrays:** One Dimensional Array – *Declaration and Initialization of One Dimensional arrays* - Two Dimensional Arrays - Multi Dimensional Arrays. **Structures:** Defining and Declaring a Structure – Accessing Structure Members – Structure Initialization – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions.

UNIT IV

9 Hrs

Function: Introduction – Multi Function Program – Function Definition – Return Values and their types – Function Call – Function Declaration – **Categories of Functions:** *No Arguments and No Return Values* - Arguments but No Return Values - Arguments with Return Values - No Arguments but Returns a Value – Functions that Return Multiple Values- Nesting of Functions– Recursion – Passing Arrays and strings to Functions.

UNIT V

9 Hrs

Pointers : Introduction – Accessing The Address Of A Variable – Declaring And Initializing Pointer Variables – Accessing Variables Through Pointers – Chain Of Pointers – Pointer Expressions – Pointer Increments – *Pointers And Arrays* – Pointers And Character Strings – Array Of Pointers – Pointers As Function Arguments – Functions Returning Pointers – Pointer To Functions – Pointers And Structures.

Note: *Italics* denotes Self Study Topics

TEXT BOOKS

1. **Balagurusamy E.,** *Programming in ANSI C*, Tata McGraw-Hill, Publishing Company Limited, 3rd Edition, 2006.

Unit I : Chapter 2: Sections 2.1 – 2.12

Chapter 3: Sections 3.1- 3.16

Unit II : Chapter 5: Sections 5.1 – 5.9

Chapter 6: Sections 6.1- 6.5

Unit III : Chapter 4: Sections 4.1 – 4.5

Chapter 7: Sections 7.1- 7.7

Chapter10: Sections 10.1 – 10.11

Unit IV : Chapter 9: Sections 9.1 – 9.18

Unit V : Chapter 11: Sections 11.1 –11.16

REFERENCE BOOKS

1. **Byron S.Gottfried**, *Programming With C*, Tata MC Graw – Hill, New Delhi, 11th Edition, 1995.
2. **Ravichandran D.**, *Programming In C*, New Age International (P) Limited, Publisher, New Delhi, 1998.
3. **Thamarai Selvi S., Murugesan R.**, *C For All*, Anuradha Agencies, Kumbakonam, 1st Edition, 1999.

- Question paper setters confine to the above text book only.

SEMESTER - III
Core Paper - VIII
C-PROGRAMMING (PRACTICAL)

Instructional Hrs : 45

Sub. Code : 15MCUCP01

Max. Marks : CIA – 40; ESE – 60

Credits : 2

Objective : On successful completion of this course (with practicals) the students should have gained knowledge about developing an algorithm using C programming language..

1. Write a program to find the sum, average, standard deviation for a given set of number.
2. Write a program to find the number of palindromes in a given sentence.
3. Write a program to generate 'n' prime numbers.
4. Write a program to multiply 2 matrices.
5. Arrange a set of numbers in ascending order using Quick sort.
6. Arrange a set of numbers in descending order using Heap sort.
7. Write functions for the following Stack operations
 - 1) Push
 - 2) Pop
 - 3) List stack
8. Write a program to print the Student's mark sheet assuming R.No, name, marks in the 5 subjects in a structure. Create an array of structures and print the mark sheet in the university pattern.
9. Write a program which takes file as command line argument and copy it to another file. At the end of the second file (i) no. of chars (ii) no. of words and (iii) no. of files.

SEMESTER – III
SKILL – BASED SUBJECT – I
DOCUMENTATION PACKAGE – LATEX

Instructional Hrs: 45

Sub. Code: 11MCUS301

Max. Marks: CIA -25; ESE -75

Credits: 3

Objectives:

- To Propagate Importance of the Open Source Software.
- As it is a programming Package, it is Useful for Typesetting and Makes the Alignment Easy and Neat.
- Upon Successful Completion of this Course, the Students will be able to type the Books, Report and Articles as a Pdf Format.

UNIT I

9 Hrs.

The basics: The basics - What is Latex?- A Small Example – Why Latex? Simple Typesetting – Spaces – Quotes – Dashes – Accents - Special Symbols - Text Positioning – Fonts - Type Style - Type Size.

UNIT II

9 Hrs.

The Document: The Document - Document Class - Font Size - Paper Size - Page Formats - Page Style - Heading Declaration - Page Numbering - Formatting Lengths - Parts of a Document - Title- Abstract - Dividing the Document - Examples- More on Sectioning Commands - What Next?

UNIT III

9 Hrs.

Table of Contents: Table of Contents, index and Glossary – Table of Contents - Additional Entries -Typesetting a Contents List - Multiple Tables of Contents - Index - Simple index

Entries- Sub Entries - Page Ranges and Cross-References - Controlling the Presentation Form-
Printing those Special Characters - Glossary.

UNIT IV

9 Hrs.

Rows and Columns: Rows and Columns - Keeping Tabs – Basics - Pushing and Popping -
More Commands – Tables - Enhancements to the Tabular - The Array Package - The Multirow
Package -Tabbing Vs. Tabular - Multipage Tables - The Package Longtable - and That's Not
All!

UNIT V

9 Hrs.

Equations: Typesetting Mathematics - The Basics - Superscripts and Subscripts – Roots -
Mathematical Symbols - Custom Commands - More on Mathematics - Single Equations -Groups
of Equations - Numbered Equations - Mathematics Miscellany – Matrices – Dots –Delimiters -
Putting One Over another - Affixing Symbols— Over or Under - New Operators - The Many
Faces of Mathematics and That is Not All! Symbols.

TEXT BOOK

Krishnan E., (Editor), *Latex tutorials a primer to Latex2 ϵ* , Indian Tex Users Group,
Trivandrum, India, 2002.

REFERENCE

<http://www.tug.org.in>

- Question paper setters are asked to confine to the above text book only.

SEMESTER III
NON MAJOR ELECTIVE - I
FUNDAMENTALS OF MATHEMATICS

Instructional Hrs: 30

Sub. Code: 09MCUN301

Max. Marks: ESE – 100

Credits: 2

Objective:

On successful completion of this course the students should have gained
Knowledge about set theory, Permutations and Combinations, Descriptive
Measures, Statistics.

UNIT I

6 hrs

Theory of Sets: Introduction – A set – Elements of a set – Method of describing a set – Types of set – Venn diagrams – Operations on set – Intersection of sets – Union of sets – Complement of a set – De-Morgan's law – Difference of two sets.

UNIT II

6 hrs

Permutations and Combinations : Introduction – Fundamental rule of counting – Permutations – Factorial notation – Permutation of n different things – Circular Permutation – Permutations of things not all different – Combinations – Restricted combinations – Combinations of things not all different.

UNIT III

6 hrs

Descriptive Measures: Arithmetic Mean – Median – Mode.

UNIT IV

6 hrs

Descriptive Measures: Standard Deviation – Co-efficient of Variance.

UNIT V

6 hrs

Probability: Introduction – Basic terminology – Mathematical Probability – Statistical Probability – Problems.

TEXT BOOKS

1. **Gupta S.C., Kapoor V.K.,** *Fundamentals of Mathematical Statistics*, Sultan Chand & Sons, New Delhi, 11th Edition (For units I & II)
2. **Sancheti D.C., Kapoor V.K.,** *Business Mathematics*, Sultan Chand & Sons, New Delhi, 11th Edition (For units III, IV & V)

Unit I : Sections 2.0 – 2.11

Unit II : Sections 9.0 – 9.6, 9.8 – 9.11

Unit III : Sections 2.5 – 2.7

Unit IV : Sections 2.13.4 and 2.14.1

Unit V : Sections 3.1, 3.3 – 3.5

REFERENCE BOOKS

1. **Aggarwal B.M.,** *Business Mathematics and Statistics Fundamentals*, Sultan Chand and Sons, New Delhi, 1st Edition, 2003.
2. **Kapur J.N.,** *Mathematical Statistics*, Sultan Chand and Company Ltd, 12th Edition, 1984.
3. **Vittal P.R.,** *Business Mathematics and Statistics*, Margham Publications, Chennai, 6th Revised and Enlarged Edition, 2004.

- Question paper setters confine to the above text book only.

SEMESTER - IV
CORE PAPER - IX
COMPLEX ANALYSIS – II

Instructional Hrs: 75

Sub. Code: 15MSUC614/15MCUC409

Max. Marks: CIA - 25; ESE - 75

Credits: 4

Objective: On successful completion of this course, the students will gain knowledge about Cauchy's theorem, singularities and residues, meromorphic functions and real definite integrals.

UNIT I

15 Hrs.

Results based on Cauchy's theorem (I) : Zeros of functions- Related integral Theorems: Cauchy's inequality – Liouville's theorem - Fundamental theorem of algebra – Maximum modulus theorem – Gauss theorem on Mean values of a harmonic function on circle – Poisson's Integral-Examples (only problems in the above sections)

UNIT II

15 Hrs.

Taylor's and Laurent's Series: Results based on Cauchy's Theorem (II) – Taylor's series – Laurent's series- Examples (only problems in the above sections)

UNIT III

15 Hrs.

Singularities and Residues: Singularities and residues – zeros – Isolated Singularities (Removable singularities, pole and essential singularity) Examples – Residues – Residue theorem – Examples (only problems in the above sections)

UNIT IV**15 Hrs.**

Real definite integrals: Evaluation by calculus of residues – integration and the unit circle – integral with (-) and (+) as lower and upper limits with following integrands:

1. $f(\cos \theta, \sin \theta)$ where f is Rational Function in $\cos \theta$ and $\sin \theta$
2. $\frac{P(x)}{Q(x)}$ where degree of $Q(x)$ Exceeds that of $P(x)$ at least by 2
3. $\sin ax. f(x), \cos ax. f(x)$, where $a > 0$ and as $f(z) \rightarrow 0$ as $z \rightarrow \theta, f(z)$ does not have a pole on the real axis.
4. $f(x)$ where $f(z)$ has a Finite Number of Poles on the Real Axis and Examples (only problems in the above sections)

UNIT V**15 Hrs.**

Meromorphic Functions: Theorem on number of zeros minus number of poles – principle of argument – Rouché's theorem – Theorem that a function which is meromorphic in the extended plane is a rational function Example

Note: Italics denote Self Study Topics

TEXT BOOK

1. **P .Duraipandian . Kayalal Pachaiyappa**, *Complex Analysis*, S.Chand & Co, NewDelhi, 2014.

Unit	Chapter	Sections
I	8	8.10, 8.11, 8.13 (only Examples in 8.10 & 8.11)
II	9	9.1 – 9.4, 9.13 (only Examples in 9.1&9.4)
III	9&10	9.5 – 9.12, 9.13 (only Examples in 9.5 - 9.12)
IV	10	10.3, 10.4 (only Examples in 10.3)
V	11	11.1- 11.3

REFERENCE BOOKS

1. **Ahlfors V.Lars**, *Complex Analysis*, Mc Graw-Hill International Book Company, 3rd Edition 1979.
 2. **Dr. S .Arumugam, A .Thangapa Isaac and A Somasundaram**, *Complex Analysis*, New Gamma Publishing House, Palayamkottai, 1999.
 3. **V.Karunakaran**, *Complex Analysis*, Narosa Publishing House, 1st edition, 2005.
- Question paper setters are asked to confine to the above **text book** only.

SEMESTER - IV

Core Paper - X

OBJECT ORIENTED PROGRAMMING WITH C++ (THEORY)

Instructional Hrs: 60

Sub. Code: 08MCUC410

Max. Marks: CIA – 25; ESE – 75

Credits: 2

Objective:

- The Aim of this Course is to explore the Programming Skill of the High Level Language C++.
- This Course Helps the Student to be Employed in the Software Companies

UNIT I

12Hrs

Principles of Object- Oriented Programming : Software crisis – Software evolution – A look at procedure-oriented programming – Object-oriented Programming Paradigm – Basic concept of Object-Oriented Programming – *Benefits of OOP* – Applications of OOP – Basic data types – User defined and derived data types – Reference variables – Operators in C++ - Scope resolution operator – Memory management operator.

UNIT II

12 Hrs

Classes and Objects : Introduction – C structures revisited – Specifying a class – defining member functions – A C++ program with class – making an outside function Inline – nesting of member functions – Private member functions – Arrays within a class – Memory allocation of objects – *Static data members* – static member functions – Arrays of objects – objects as function arguments – Friendly functions – Returning objects – pointers to members – Console I/O operations: Formatted console I/O operations – managing output with manipulators.

UNIT III

12 Hrs

Functions: Introduction – The main function – Function Prototyping – Call by reference – Return by reference – Inline functions – *Default arguments* – Const arguments – Function overloading. **Pointers:** Introduction – Pointers – Pointers to objects – ‘this’ pointer – Pointers to derived classes – Virtual functions – Pure virtual functions.

UNIT IV

12 Hrs

Constructors and Destructors : Introduction – Constructors – Parameterized constructors – Multiple Constructors in a class – Constructors with default arguments – Dynamic initialization of objects – Copy Constructors – Dynamic Constructors – Constructing two dimensional arrays – Const objects – Destructors. **Operator Overloading:** Defining operator overloading – Overloading unary and binary operators – Overloading binary operators using friend function – *Manipulation of strings using operators* – Rules for overloading operators.

UNIT V

12 Hrs

Inheritance: Introduction – Defining derived classes – Single inheritance – Making a private member inheritable – Multilevel inheritance – Multiple inheritances – Hierarchical inheritance – Hybrid inheritance – *Virtual base classes* – Abstract classes – Constructors in derived classes – Member classes – Type conversions.

Note: *Italics* denotes Self Study Topics

TEXT BOOK

1. **Balagurusamy E.**, *Object Oriented Programming in C++*, Tata MCGraw - Hill Publishing Company Limited, 2nd Edition, 2006.

Unit I:	Chapter 1:	Sections: 1.1 – 1.8
	Chapter 3:	Sections:3.5- 3.7, 3.12 – 3.16
Unit II:	Chapter 5:	Sections: 5.1 – 5.19
	Chapter 10:	Sections:10.5- 10.6
Unit III:	Chapter 4:	Sections:4.1 – 4.9
	Chapter 9:	Sections:9.1- 9.7
Unit IV:	Chapter 6:	Sections: 6.1 – 6.11
	Chapter 7:	Sections: 7.1 – 7.7
Unit V:	Chapter 7:	Sections: 7.8 only
	Chapter 8:	Sections: 8.1 – 8.12.

REFERENCE BOOKS

1. **Balagurusamy E.**, *Programming in C++*, Tata MCGraw – Hill Publishing Company Ltd., 2002.
2. **Bjarne Stroustrup**, *the C++ Programming Language*, Pearson Education Pvt. Ltd., 2005.
3. **Robert W.**, *Object Oriented Programming in Turbo C++*, Galgotia Publications Pvt. Ltd., 1995.
 - Question paper setters confine to the above text book only.

SEMESTER - IV

Core Paper X

OBJECT ORIENTED PROGRAMMING WITH C++ (PRACTICAL)

Instructional Hrs : 45

Sub. Code : 15MCUCP02

Max. Marks : CIA – 40 ; ESE – 60

Credits : 2

Objective : On successful completion of this course with practicals the students should have gained knowledge about developing an algorithm using C++ Programming Language.

Objects and Classes

1. Create a class to implement the data structure stack. Write a constructor to initialize the top of the stack to zero. Write a member function Push() to insert an element and member function Pop() to delete an element. Check for overflow and underflow conditions.
2. Create a class Arith which consists of a float and an integer variable. Write member functions Add(), Sub(), Mul(), Div(), Mod() to perform addition, subtraction, multiplication, division and modulus respectively. Write member functions to get and display values.

Operator Overloading

3. Create a class mat has a 2–D matrix and R & C represents the rows and columns of the matrix. Overload the operators +, -, * to add, subtract and multiply two matrices. Write member function to get and display mat object values.

4. Create a class string. Write member function to initialize, get and display strings. Overload the operator + to concatenate two strings, = to compare two strings and a member function to find the length of the string.

Inheritance

5. Create a class shape which consists of two virtual functions Cal area () and Cal peri () to calculate area and perimeter of various figures. Derive three classes Square, Rectangle and Triangle from the class Shape and calculate Area and Perimeter of each class separately and display the result.

6. Create two classes which consist of two private variables, one integer and one float variable in each class. Write member functions to get and display them. Write a friend function common to both classes which takes the object of the above two classes as arguments and the integer and float values of both the objects separately and display the result.

Console I/O

7. Write a user-defined function Userfun() which has the formatting commands like setw(), showpoint(), showpos(), precision(). Write a program which prints a multiplication table and uses Userfun() for formatting.

Files

8. Write a program which takes a file as argument and copies into another file line numbers using command line arguments.

SEMESTER - IV
Core Paper - XI
ANALYTICAL GEOMETRY

Instructional Hrs: 90

Sub. Code: 15MCUC411

Max. Marks: CIA – 25; ESE – 75

Credits: 5

Objective:

Students are exposed to the Fundamental Aspects of Two and Three Dimensional Analytical Geometry and it Develops Logical and Systematic Computational Skills.

UNIT I

18Hrs

Analytical geometry of two dimensions: Polar Coordinates – Equation of a Conic - Directrix – Chord – Tangent – *Normal* – Some Properties of General Conic - Simple Problems.

UNIT II

18Hrs

Analytical geometry of three dimensions : Straight Lines – Coplanarity of Straight Lines – Shortest Distance (S.D) and Equations of S.D between Two Lines – Line Intersecting a given Line – *Lines of Intersection of Three Planes* - Simple problems.

UNIT III

18Hrs

Sphere: Standard Equation of Sphere – *Results Based on the Properties of a Sphere* – Tangent Plane to a Sphere – Equations of a Circle.

UNIT IV

18Hrs

Cone and Cylinder: Cone whose Vertex is at the Origin – Enveloping Cone of a Sphere – *Right Circular Cone* – Equation of a Cylinder – Right Circular Cylinder.

UNIT V

18Hrs

Conicoids : Nature of a Conicoids – Standard Equation of a Central Conicoid – Enveloping Cone – Tangent Plane – *Conditions for Tangency* – Director Sphere and Director plane.

Note: *Italics* denotes Self Study Topics

TEXT BOOKS

1. **Duraipandian P., Laxmi Duraipandian, Muhilan D.,** *Analytical Geometry – 3 dimensional*, Emerald Publishers, Revised Edition, 1986.
2. **Manicavachagom Pillay T.K., Natarajan T.,** *Analytical Geometry*, S. Viswanathan (Printers & Publishers), Pvt., Ltd., 14th Edition, 2006.

REFERENCE BOOKS

1. **Barnett Rich revised by Philip A. Schmidt,** *Geometry*, Tata MCGraw Hill Publishing Company Limited, 3rd Edition.
2. **Duraipandian P., Laxmi Duraipandian, Muhilan D.,** *Analytical Geometry – 2 dimensional*, Emerald Publishers, Revised Edition, 1983.
3. **Sharma A.K.,** *Text book of 3D, Sphere, Cone and Cylinder*, Discovery Publishing House, 1st Edition, 2005.

- Question paper setters confine to the above text books only.

SEMESTER – IV
SKILL BASED SUBJECT - II
MULTISKILL DEVELOPMENT PAPER

Instructional Hrs : 45

Sub Code: 15MCUS402

Max.Marks :100 (ESE – 60 CIA – 40)

Credits: 3

Aim: To equip the students with knowledge on all topics as desirable from the point of view of brilliant success in the competitive examinations.

Objective: To familiarize the students with various types of tests that are employed by the diverse examining bodies.

UNIT I

9 Hrs.

Communication: Question tag – Gerund and Infinitives – Spotting the errors – Vocabulary – Synonyms – Antonyms - Prepositions – Articles – One word substitution – Sentence completion.

UNIT II

9 Hrs.

Numerical Aptitude : Problems on numbers - Problems on Ages – Percentage - Profit and loss - Ratio & Proportion - Time & Work - Time & Distance - *Simple Interest* - Compound Interest.

UNIT III

9 Hrs.

Critical Reasoning : Logical Inference Questions and Syllogism.

Analytical Reasoning : Arrangement problems – Family / Blood Relation Qualms – Sense of Directions – Age Doubts.

Verbal Reasoning : Verbal Analogy (Letter series and number series only) – Coding and Decoding.

Objective: On successful completion of this course, the students will learn the document writing using word, calculations using excel, creation and manipulation of tables using access, and power point slide shows.

Unit: IV

9 Hrs.

1. Use the style inspector to insert a picture, header and footer of text. Align the paragraph with a picture at the right side of the text.
2. Create a table and fit the contents to the cells. Convert the given text to table and table to text. Apply Borders & Shading.
3. Illustrate the mail merge concept to apply for a suitable job for atleast 5 companies using Auto wizard.
4. Build a worksheet to perform correlation and regression coefficients using formulae and check the answer with built – in functions.
5. Worksheet preparation for electricity bill preparation.
6. Create a Pivot Table & Chart.

Unit: V

9 Hrs.

7. Prepare a power point presentation using cropping & sizing options. Use all the slide transition facilities and Rehearse timings.
 8. Prepare an organizational chart for a college environment using power point presentation.
 9. Create a table with the given data using MS Access (use adding & deleting data options).
- Create a Report & Form with the given data by adding controls.

SEMESTER - IV
NON MAJOR ELECTIVE - II
INDUSTRIAL MATHEMATICS

Instructional Hr: 30

Sub. Code: 09MCUN402

Max. Marks: ESE – 100

Credits: 2

Objective:

On Successful Completion of this Course the Students should have gained Knowledge about Inventory, Games and Strategies.

UNIT I

6 Hrs

Inventory: Cost associated with Inventory – Factors affecting Inventory control – Economic Order Quantity (EOQ).

UNIT II

6 Hrs

Inventory: Inventory problems without shortages.

UNIT III

6 Hrs

Inventory: Inventory problems with shortages.

UNIT IV

6 Hrs

Games and Strategies: Introduction – Two person zero sum game – The maximum minimum principle – games with saddle points.

UNIT V

6 Hrs

Games without Saddle Points: Mixed strategies – Graphical solution of $2 \times n$ and $m \times 2$ games.

TEXT BOOK

1. **Kantiswarup, Gupta P.K., Man Mohan,** *Operations Research*, Sultan Chand and Sons, New Delhi, 14th Edition, 2008.

Unit I : Chapter 19 – Sections 19.1, 19.6-19.9.

Unit II : Chapter 19 - Sections 19.10.

Unit III : Chapter 19 - Sections 19.11

Unit IV : Chapter 17 - Sections 17.1-17.4

Unit V : Chapter 17 - Sections 17.5-17.6

REFERENCE BOOKS

1. **Hamdy A.Taha,** *Operations Research - An Introduction*, Prentice Hall of India Pvt. Ltd., 7th Edition, 2003.
2. **Hillier S., Gerald J.Lieberman,** *Introduction To Operations Research*, Frederick Tata McGraw Hill Publishing Company Ltd., New Delhi, 7th Edition.
3. **Sharma J.K.,** *Operations Research Problems and Solutions*, Macmillan India Ltd., 3rd Edition, 2009.

- Question paper setters confine to the above text book only.

SEMESTER - V

CORE PAPER - XII

REAL ANALYSIS – I

Instructional Hrs. 90

Sub. Code: 15MSUC509 / 15MCUC512

Max. Marks: CIA - 25; ESE - 75

Credits: 3

Objective: To understand the basic notions of Set Theory, Real Number System and to enhance the Mathematical fluency in pure mathematics and to gain knowledge about Covering of Sets and Convergent Sequence.

UNIT I

18 Hrs.

The real number system: The field axioms - the order axioms – Integers – The Unique Factorization theorem for integers – Rational numbers – Irrational numbers – Upper bounds, maximum elements, least upper bound – The completeness axiom - some properties of the supremum – Properties of the integers deduced from the completeness axioms – The Archimedian property of the real number system - Rational numbers with finite 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.*- Simple problems related to upper bound, lower bound, supremum and infimum of a set in \mathbb{R} .

UNIT II

18 Hrs.

Basic notions of set theory: Notations – ordered pairs – Cartesian product of pair sets – Relations and Functions – further terminology concerning functions – one – one functions and inverses – Composite functions – Sequences – Similar sets – Finite and Infinite sets – Countable and Uncountable sets – Unaccountability of the real number system – Set algebra – *Countable collection of countable sets* – Simple problems related to countable and uncountable sets.

UNIT III**18 Hrs.**

Elements of Point Set Topology: Euclidean space R^n – open balls and open sets in R^n - The structure of open sets in R^n – closed sets and adherent points – The Bolzano - Weierstrass theorem – the Cantor intersection theorem – Simple problem related to open balls, open sets and closed sets, interior points, adherent points and accumulation points.

UNIT IV**18 Hrs.**

Covering: Lindelof covering theorem – the Heine Borel covering theorem – Compactness in R^n – Metric spaces: Metric spaces – Point set topology in metric spaces – Compact subsets of a metric space – *Boundary of a set* – Examples of metric spaces, compact subsets.

UNIT V**18 Hrs.**

Convergent : Introduction - Sequences in a metric space –Cauchy Sequences – Complete Sequences – Complete metric spaces - *Limit of a function* – Examples of Cauchy sequences, complete sequence and complete metric space.

Note : *Italics denote Self Study Topics*

TEXT BOOKS

1. **Tom M. Apostol**, *Mathematical Analysis*, Narosa publishing house, New Delhi, 2nd Edition, 2002.

Unit	Chapter	Sections
I	1	1.1 - 1.20
II	2	2.1 – 2.15
III	3	3.1 – 3.6
IV	3	3.7 – 3.16
V	4	4.1 – 4.5

REFERENCE BOOKS

1. **Robert G. Bartle, Donald R. Sherbert**, *Introduction to Real Analysis*, John Wiley and Sons, INC, 2nd Edition, 1994.
2. **K.S.Narayanan., Dr. K.Chandrasekhara Rao**, *Real Analysis Vol I*, S.Viswanathan Printers & Publishers Pvt.Ltd., 1st Edition, 1995.
3. **K .Viswanatha Naik.**, *Real Analysis*, Emerald Publishers, Reprint-1992.
4. **S.C.Malik, Savita Arora**, *Mathematical Analysis*, Wiley Eastern limited Second Edition,1991.

- Question paper setters are asked to confine to the above text book only

SEMESTER V
CORE PAPER -XIII
MODERN ALGEBRA – I

Instructional Hrs. : 90

Sub. Code : 09MSUC511/09MCUC513

Max. Marks : CIA -25; ESE -75

Credits: 4

Objective: On successful completion of this course the students should have gained knowledge about sets, groups, homomorphisms, rings, ideals and quotient rings.

UNIT I

18 Hrs.

Sets, Mapping and Groups: Sets – Mappings - Relations and Binary Operations - Groups - Definition and *Examples* – Basic Properties.

UNIT II

18 Hrs.

Subgroups: Cyclic Groups - Normal Subgroups & *Quotient Groups*.

UNIT III

18 Hrs.

Homomorphisms, Automorphism and Permutation Groups: Homomorphisms - *Automorphism* - Cayley's Theorem - Permutation Groups.

UNIT IV

18 Hrs.

Rings: Definition and Examples Basic Properties – *Special Classes of Rings* – Integral Domains and Fields – Homomorphism of Rings.

UNIT V

18 Hrs.

Ideals and Quotient Rings: Ideals and Quotient Rings - Maximal, Principal Ideals - The *Field of Quotient of an Integral Domains.*

Note : *Italics* denotes Self Study Topics

TEXT BOOK

1. **Herstein I.N** , *Topics in Algebra*, Wiley India Pvt, Ltd., New Delhi, Second Edition, Reprint-2007.

REFERENCE BOOKS

1. **Arumugam.S**, *Morden Algebra*, **Isaac.A.T**, Scitech Publications(India)Pvt Ltd, Chennai, Sixth Reprint December 2006
2. **Surjeet Singh, Qazi zameeruddin**, *Morden Algebra*, Vikas Publishing House Pvt Ltd, Seventh Edition, Reprint 2004.
3. **John B. Fraleigh**, *A First course in Abstract Algebra*, Naroso publishing House, New Delhi, Third Edition.

- Question paper setters are asked to confine to the above **text book** only.

SEMESTER - V
Core Paper - XIV
VISUAL BASIC (THEORY)

Instructional Hrs: 45

Sub.Code: 08MCUC514

Max. Marks: CIA – 20; ESE – 55

Credits: 3

Objective: On Successful Completion of this Course the Students should have

Gained Knowledge about VB Fundamentals, Menus, Modules and
Procedures, Arrays and about the File Accessing.

UNIT I

9 Hrs

Introduction to VB : Event and Event procedure – Object related concepts– VB program development process – components – VB environment – saving and running VB project VB fundamentals – constants – Variables– Operators – *Library functions*.

UNIT II

9 Hrs

Branching and Looping: *Logical operators* – If_then, If-then-Else, Select Case – For Next, Do Loop, While – Wend, Stop – VB control functions – Forms and controls.

UNIT III

9 Hrs

Menus and Dialog Boxes : Building Drop down menus, Accessing menu – submenus – Popup menus – *Dialog Boxes* – Executing and debugging a new project – Errors – Error handlers.

UNIT IV

9 Hrs

Procedures: Modules & Procedures – Sub procedures – Event Procedures – Function procedures. **Arrays:** Characteristics – Declarations – Dynamic arrays – *Control arrays*.

UNIT V

9 Hrs

Data files: Characteristics – accessing and saving a file in VB – Processing – Sequential data file – Random access file – *Binary Files*.

Note: *Italics* denotes Self Study Topics

TEXT BOOK

1. **Byron S Goutfield**, *Visual Basic*, Schamn's outlines, TMH Edition, 2002

REFERENCE BOOKS

1. **Mc Bridge P.K.**, *Programming in VB*, BPB Publications, New Delhi, 1st Edition, 1995.
2. **Mohammed Azam**, *Programming with VB 6.0*, Vikas Publications, 2001.
3. **Noel Jerke**, *Visual Basic 6: The Complete Reference*, Tata MCGraw – Hill Publishing Company Ltd., New Delhi, 2003.

- Question paper setters confine to the above text book only.

SEMESTER - V
Core Paper - XIV
VISUAL BASIC (PRACTICAL)

Instructional Hrs: 30

Sub. Code: 15MCUCP03

Max. Marks: CIA – 10; ESE – 15

Credits: 2

Objective: On Successful Completion of this Practical Course the Students should have

Gained Knowledge in Writing the Programs with Library Functions, Combo
Box, Timer Control, Scroll Box, Menus, Input Box and Procedures.

1. In VB, create a project that displays the current data and time. Use VB variable Now and the Format Library functions.
2. Write a program to enter and display text. Use text box and command button.
3. Write a program to convert temperature from Fahrenheit to Centigrade or vice – versa.
4. Write a program to select any one from a list. Use combo box to display choices.
5. Write a program to calculate factorial of a given number.
6. Write a program to illustrate the use of Timer control.
7. Write a program to illustrate the usage of scroll bars.
8. Write a program to illustrate the usage of Dropdown menus.
9. Write a program to illustrate the usage of menu enhancement.
10. Write a program to illustrate the usage of pop-up menu.
11. Write a program to illustrate the usage of input boxes.
12. Write a program to find smallest of n numbers.
13. Write a program to find the sine of angle.
14. Write a program to sort list of numbers.
15. Write a program to determine deviations about an average.

SEMESTER – V
CORE PAPER - XV
OPERATIONS RESEARCH

Instructional Hrs: 75

Sub. Code: 15MCUC515

Max. Marks: CIA -25; ESE -75

Credits: 5

Objectives: Operations Research Deals Mainly with Mathematical Modeling and Formulating Real Life Problems into Mathematical Models. It also Provides Methods of Solving such Models. Hence, it makes the Students to Apply their Mathematical Knowledge in Real Life Situations.

UNIT I

15Hrs.

Linear Programming Problem: Mathematical Formulation of the Problem– Graphical Solution – Simplex Method – *Two Phase Simplex Method*.

UNIT II

15Hrs.

Linear Programming Problem: Clarnes’s Method of Penalties – Duality in Linear Programming & *Dual Simplex Methods*.

UNIT III

15Hrs.

Transportation Problem: Initial Basic Feasible Solution – North-West Corner Rule – *Least Cost Method* – Vogel’s Approximation Method – Optimum Basic Feasible Solution – Modi Method.

Assignment Problem: Introduction – Mathematical Formulation Hungarian Assignment Method – Maximization in Assignment Problem – Unbalanced Assignment Problem – Prohibited Assignment.

UNIT IV

15Hrs.

Queuing Theory: Elements of Queuing System – Prohability Distribution Queuing System – *Poisson Queuing System* – Single Channel Model:

- (i) Model $\{(M/M/1): (\infty/\text{FIFO})\}$,
- (ii) Model $\{(M/M/1): (N/\text{FIFO})\}$

UNIT V

15Hrs.

Dynamic Programming: Introduction – Recursive Equation Approach – *Characteristics of DPP* – Dynamic Programming Algorithm – Solution of LPP by Dynamic Programming.

Note : *Italics denotes Self Study Topics*

TEXT BOOK

1. **Kantiswarup, Gupta P.K, Man Mohan, Operations Research, Sultan Chand & Sons, New Delhi, 14th Edition, 2009.**

REFERENCE BOOKS

1. **Frederick Hillier, Gerald J Liberman, Introduction to Operations Research , Tata McGraw Hill Publications Company Ltd., New Delhi, 5th Edition, 1990.**
2. **Hamdy A.Taha, Operations Research: An Introduction, Prentice Hall of India Pvt. Ltd., 7th Edition, 2003.**
3. **Sharma J K, Operations Research: Problems and Solutions, Macmillan India Ltd., 3rd Edition, 2009.**

- Question paper setters confine to the above text book only.

SEMESTER _ V

ELECTIVE _ I

NUMERICAL METHODS

Instructional Hrs. : 75

Sub.Code :11MCUE501

Max. Marks : CIA _25; ESE _75

Credits: 5

Objective: On successful completion of this course the students should gain knowledge about solutions of numerical algebraic and transcendental equations, simultaneous linear algebraic equations, Finite differences and types of operators.

UNIT I

15 Hrs.

Solution of Numerical Algebraic and Transcendental Equations: The Bisection Method – Method of Successive Approximation – The Method of False Position – Newton – Raphson Method – Convergence of Newton’s Method and Rate of Convergence – *Geometrical Interpretation of Newton’s Method.*

UNIT II

15 Hrs.

Finite Difference: First Difference – Higher Differences – *Difference Tables* – Expressing any Value of y in terms of the Initial Value y_0 and the Differences – Backward Differences – Expressing any Value of y in Terms of y_n and the Backward Differences of y_n – Central Differences – Properties of the Operator Δ – Differences of a Polynomial – Error propagation in difference table.

UNIT III

15 Hrs.

Finite Difference: The Operator E – Relation Between E and Operator D and Other Difference Operators – Relationship Between Operators – Interpolation – Linear Interpolation – Gregory – Newton Forward Interpolation Formula – Gregory – Newton Backward Interpolation Formula – *Equidistant with one or more Missing Values.*

UNIT IV

15 Hrs.

Central Differences and Interpolation Formulae: Central Differences – Interpolation Formulae – Central Difference Tables – Gauss's Forward Interpolation Formula – Gauss's Backward Interpolation Formula – Stirling's Formula – Bessel's Formula – Divided Differences – Properties of Divided Difference – *Newton's Interpolation Formula for Unequal Intervals.*

UNIT V

15 Hrs.

Difference Equations: Definition – Linear Difference Equation – Linear Homogeneous Difference Equations with Constant Coefficients – Cases when the Auxiliary Equations having Equal Roots – Cases where the Auxiliary Equation having Imaginary Roots – Having Repeated Roots – Non-Homogeneous Linear Difference Equations with Constant Coefficients – *Useful Formulae to Evaluate the Particular Integral in Certain Cases.*

Note : *Italics* denotes Self Study Topics

TEXT BOOK

1. **Venkataraman M.K,** *Numerical Methods in Science and Engineering*, The National Publishing Company, Madras, 5th Edition, 2001.

REFERENE BOOKS

1. **Chapra S.C, Raymond P.C**, *Numerical Methods for Engineers*, Tata McGraw Hill, 2000.
 2. **Kandasamy P, Thilagavathy K, Gunavathi K**, *Numerical Methods*, S.Chand & Company Ltd., 2007.
 3. **Sastry S.S**, *Introductory Methods to Numerical Analysis*, Prentice Hall of India,1998.
- Question paper setters are asked to confine to the above **text book** only.

SEMESTER _ V
SKILL_BASED SUBJECT_III
MATHEMATICS FOR COMPETITIVE EXAMINATIONS

Instructional Hrs: 45

Sub. Code: 11MCUS503

Max. Marks: CIA _25; ESE _75

Credits: 3

Objective: To make the Students understand the Problems and Overcome the
Competitive Exams.

UNIT I: **9 Hrs.**

Numbers – H.C.F & L.C.M of numbers – Decimal Fractions – Problems.

UNIT II: **9 Hrs.**

Square roots & cube roots – Averages – Problems on numbers – Problems.

UNIT III: **9 Hrs.**

Problems on ages – Percentage – Problems.

UNIT IV: **9 Hrs.**

Profit & loss – Ratio & proportion – Problems.

UNIT V: **9 Hrs.**

Time & Distance – Simple Interest – Compound Interest – Problems.

TEXT BOOK

1. **Aggarwal R.S., *Quantitative Aptitude***, Sultan Chand & company Ltd, New Delhi 2005.

Unit I : Pg.No: 3 _ 66.

Unit II : Pg.No: 117 – 181.

Unit III : Pg.No: 182 – 194, 208 – 250.

Unit IV : Pg.No: 251 – 310.

Unit V : Pg.No: 384 – 404, 445 – 486.

REFERENCE BOOKS

1. **Abhijit Guha, *For Competitive Examinations***, Tata Mc Graw Hill Publishing Company Ltd, New Delhi, 3rd Edition, 2008.
2. **Bharat Jhunjhunwala, *Quantitative Aptitude***, Chand and Company Limited, New Delhi, 2008.
3. **Trishna, *Qunatitative Aptitude***, Pearson Education, New Delhi, 2nd Edition 2009.

- Question paper setters confine to the above text book only.

SEMESTER - VI

CORE PAPER - XVI

REAL ANALYSIS – II

Instructional Hrs. : 90

Sub. Code: 15MSUC613 /15MCUC616

Max. Marks: CIA - 25; ESE -75

Credits: 4

Objective: To gain knowledge about continuous functions, connectedness and to understand the concept of Riemann-Stieltjes integral.

UNIT I

18 Hrs.

Continuous Functions and Topological Mapping: Continuity of Composite Function - Examples of Continuous Functions – Continuity and Inverse Images of Open or Closed Sets – Functions Continuous on Compact Sets – Topological Mappings – *Bolzano's Theorem* – Simple problems related to continuities and discontinuities of a function.

UNIT II

18 Hrs.

Connectedness and Uniform Continuity: Connectedness - Components of a Metric Space – Uniform Continuity – Uniform Continuity and Compact Sets – Fixed Point Theorem for Contractions – *Monotonic Functions* – Simple problems related to uniform continuity and monotonic functions.

UNIT III

18 Hrs.

Derivatives: Definition of Derivative – Derivatives and Continuity – Algebra of Derivatives – The Chain Rule – One sided Derivatives and Infinite Derivatives – Function with non-zero Derivatives – *Intermediate Value Theorem for Derivatives* – Simple problems related to differentiability and continuity.

UNIT IV

18 Hrs.

Derivatives: Zero Derivatives and Local Extrema – Rolle’s Theorem – The Mean Value Theorem for Derivatives – Generalized Mean Value Theorem - Taylor’s Formula with Remainder - *Derivatives of Vector – Valued Functions* – Partial Derivatives – Simple problems related to mean value theorem, Taylor’s theorem and partial derivatives.

UNIT V

15 Hrs.

The Riemann-Stieltjes Integral: Introduction – Notation – The Definition of Riemann-Stieltjes Integral - Linear Properties – *Integration by Parts* – Change of Variables in the Riemann-Stieltjes Integral – Reduction to a Riemann Integral.

Note : *Italics denote Self Study Topics*

TEXT BOOK

1. **Tom.M.Apostol**, *Mathematical Analysis*, Narosa Publishing house, New Delhi, 20th Reprint, 2002.
2. **S.C.Malik, Savita Arora**, *Mathematical Analysis*, Wiley Eastern limited Second edition 1991.

REFERENCE BOOKS

1. **Dr.Chandrasekhara Rao, Dr.Narayanan.K.S.**, *Real Analysis Volume I*, S.Viswanathan printers & publishers pvt.ltd. 1st Edition-1995.
2. **Viswanatha Naik.K.**, *Real Analysis*, Emerald publishers, Reprint-1992.
3. **Robert G. Bartle, Donald R. Sherbert**, *Introduction to Real Analysis*, John Wiley and Sons, INC, Second Edition 1994.

- Question paper setters are asked to confine to the above **text book** only

SEMESTER - VI
CORE PAPER - XVII
MODERN ALGEBRA - II

Instructional Hrs. : 90

Sub. Code : 15MSUC615 /15MCUC617

Max. Marks : CIA - 25; ESE - 75

Credits:4

Objective: On successful completion of this course, the students will gain knowledge about matrices, vector spaces and linear transformations.

UNIT I

18 Hrs

Matrices: Algebraic operation – *triangular, diagonal, scalar and unit matrices* – Transpose, adjoint and inverse of a square matrix – symmetric and skew – symmetric matrices - Hermitian and skew – hermitian matrices – orthogonal and unitary matrices – *rank of a matrix* – characteristic roots and characteristic vectors of a square matrix.

UNIT II

18 Hrs

Diagonalization and Canonical forms : Diagonalization – *Orthogonal diagonalization* – Minimal polynomial – Quadratic form – Canonical form – Jordon Canonical form.

UNIT III

18 Hrs

Vector space : Definition and examples – basic properties – Linear independence – Basis – *Dimensions*.

UNIT IV

18 Hrs

Finite dimensional vector spaces: Homomorphisms of vector spaces – *inner product space*.

UNIT V

18 Hrs

Linear transformations : Algebra of linear transformations – characteristic roots – *Matrices*.

Note : *Italics* denote Self Study Topics

TEXTBOOKS

1. **Department of Mathematics**, Vellalar College for Women, *Matrices*, Sriram offset, 2015.
2. **I.N. Herstein** , Treatment as in “*Topics in Algebra*”, Wiley India Pvt. Ltd., New Delhi, 2nd Edition, 2007. (Units III, IV, V)

Unit	Chapter	Section
III	4	4.1,4.2
IV	4	4.2,4.4
V	6	6.1, 6.2, 6.3

REFERENCE BOOKS

1. **S.Arumugam, A.T.Isaac**, *Modern Algebra*, Scitech Publications(India) Pvt Ltd, Chennai, 6th Reprint, December 2006
2. **Surjeet Singh, Qazi Zameeruddin**, *Morden Algebra*, Vikas Publishing House Pvt Ltd, 7th Edition, Reprint 2004.
3. **M.K.Venkataraman**, *Linear Algebra*, The National Publishing House, 1st Edition, 1999.

- Question paper setters are asked to confine to the above **text books** only.

SEMESTER _ VI
Core Paper _ XVIII
INTERNET AND JAVA PROGRAMMING (THEORY)

Instructional Hrs: 60

Sub. Code: 10MCUC618

Max. Marks: CIA – 20; ESE – 55

Credits: 3

Objective:

- The Aim of the Course is to explore the Programming Skills.
- To Get Knowledge about Objects Methods, Arrays & Interfaces.
- On Successful Completion of this Course the Students Should have the Knowledge about Java Programming & Applet.

UNIT I

12Hrs

Internet & HTML : Introduction to Internet –Internet technologies – Internet browsers_ Introduction to HTML – head and body sections – designing the body section – ordered and unordered lists – *table handling*.

UNIT II

12 Hrs

Java Evolution : Java features– java environment – how java differ from C and C++ _ Over view of java language _ introduction – java program structure – constants, variables and data types – *operators and expressions – decision making and branching – decision making and looping*.

UNIT III

12 Hrs

Classes, Objects and Methods: *Arrays, strings and vectors.* **Interfaces:** multiple inheritances

UNIT IV

12 Hrs

Packages: Putting classes together – multithreaded programming – managing errors and *exceptions*.

UNIT V

12 Hrs

Applet: Applet programming – *graphics programming*.

Note: *Italics* denotes Self Study Topics

TEXT BOOKS

1. **Balagurusamy E.**, *Programming with Java*, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2nd Edition.
2. **Xavier C.**, *World Wide Web Design with HTML*, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2008.

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REFERENCE BOOKS:

1. **Herbert Schildt**, *The Complete Reference Java 2*, Tata McGraw Hill Publishing Company Ltd., New Delhi, 5th Edition, 2004.
2. **Harley Hahn**, *The Internet – Complete Reference*, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2nd Edition.
3. **Patric Naughton**, *Java Hand Book*, Tata McGraw Hill Publishing Company Ltd., New Delhi, 1997.

- Question paper setters confine to the above text books only

SEMESTER -VI
Core Paper - XVIII
INTERNET AND JAVA PROGRAMMING (PRACTICAL)

Instructional Hrs: 45

Sub. Code: 15MCUCP04

Max. Marks: CIA – 10; ESE – 15

Credits: 1

Objective: On successful Completion of this Practical Course the Students should have

Gained Knowledge about Java Evolution, Classes, Objects and Methods,
Packages and Applet Programming.

HTML:

1. Create a program using HTML to display the ordered list and unordered list of department store .
2. Create a program to display images and text using HTML tag for an, advertisement of a company products
3. Create a table to display list of products using HTML tags.

JAVA:

4. Write a program that will accept command line argument and print the same.
5. Write a program to display the months of your. The months of the year should be held in an array.
6. Write a program that has overload methods. The first method should accept no arguments, the second method will accept one string and the third method will accept a string and an integer. The first method should display the message “Rose is a beautiful flower” twice. The second method should display the message “sun flower is a beautiful flower” twice. The third method should display the message “Marigold is a beautiful flower” four times.

7. Write a program to sort the elements of an array in ascending order.
8. Create a class called, Numeral that accepts an array of ten numbers. Create a sub class called Numplay which has a menu as follows.
 - a. Display numbers entered.
 - b. Sum of the numbers.
 - c. Average of the numbers.
 - d. Maximum of the numbers.
 - e. Minimum of the numbers.
9. Create an applet to obtain the list of fonts available with the current java working environment.
10. Create an interface called Variable Test which contains a method disp() and two variables x, y which are integers and whose value is set as 10 and 20. Create a class called VarIntTest which implements this interface. The disp() method should display a message “Inside interface – Variable Test and method disp”. Write a method called display () within VarIntTest class prints the value of x.
11. Create two threads, one of the threads has to print even numbers and another should print odd numbers.
12. Write a program to display the course name, fees and the duration using a String Tokenzier class.

SEMESTER - VI

PRACTICAL – MATLAB, SPSS AND MICROSOFT MATH 3.0

Instructional Hrs: 45

Subject Code: 15MCUCP05

Max.Marks: CIA- 40; ESE-60

Credits :3

MATLAB :

1. Write a program to find the following for the matrices
(i)Sum (ii) Product (iii) Determinant (iv) Sum of the diagonal (v) 2nd row of the transpose.
2. Write a program to
(i)Find the Eigen values, Eigen vectors & Inverse for a given matrix.
(ii)Check whether the given matrix is orthogonal.
3. Write a program to find the solution of a given system of equations by LU Decomposition method.
4. Write a program to solve the given system of equations by using Gaussian Elimination method.
5. Write a program to find the value of
(i) $\sin(x)$ and $\sinh(x)$ (ii) $\cos(x)$ and $\cosh(x)$ (iii) $\tan(x)$ and $\tanh(x)$ for $x = 0, \frac{\pi}{2}, \pi$
6. Write a program to find the zero of the function $x^2 - \sin x$ at $x = \frac{\pi}{4}$
7. Write a program to evaluate the following (i) Single Integral (ii) Double Integral with finite limits.
8. Write a program to solve Lagrangian polynomial for the given data.
9. Write a program to solve the first and second order differential equations.

SPSS:

10. Write a program to find the following for the numerical data
(i) Mean (ii) Median (iii) Harmonic Mean (iv) Geometric Mean (v) Variance and Standard Deviation.

11. Write a program to find the probability function by using
(i) Binomial Distribution (ii) Poisson Distribution (iii) Normal Distribution.
12. Write a program to create a database, present the data through charts and diagrams and summarize the data using frequencies.
13. Write a program to apply T- test for an analysis of (i) One sample (ii) Independent samples (iii) Paired samples.
14. Write a program to analysis means of different variables by using one way ANOVA table.
15. Write a program to fit a (i) straight line (ii)Exponential.

MICROSOFT MATH 3.0

16. Write a program to check whether the given function is (i) continuous (ii)Differentiable (iii) Analytic.

SEMESTER – VI
ELECTIVE PAPER _ II
OPTIMIZATION TECHNIQUES

Instructional Hrs: 75

Sub.Code: 11MCUE602

Max. Marks: CIA _25; ESE _75

Credits: 5

Objectives: Optimization Techniques Deals Mainly with Mathematical Modeling and Formulating Real Life Problems into Mathematical Models. It also Provides Methods of Solving Such Models. Hence, it makes the Students to Apply their Mathematical Knowledge in Real Life Situations

UNIT I

15Hrs

Integer Programming: Introduction – Pure and Mixed Integer Programming Problems – Gomory’s Constraints – Fractional Cut Method for all LPP Method and *Mixed Integer LPP Method*.

UNIT II

15Hrs

Network Scheduling: Critical Path Method (CPM) – *Program Evaluation and Review Techniques (PERT)*.

UNIT III

15Hrs

Inventory Control: Introduction – Types of Inventories – Reasons for Carrying Inventories – The Inventory Decisions – Objectives of Scientific Inventory Control – Costs Associated with Inventories – *Factors Affecting Inventory Control* – Concept of EOQ – Inventory Problem without Shortages – Inventory Problem with Shortages.

UNIT IV

15Hrs

Non_Linear Programming Problem: Non_Linear Programming Problem – General NLPP – Constrained Optimization with Equality Constraints – Necessary Conditions for a General NLPP

– Sufficient Conditions for a General NLPP with one Constraint_ *Sufficient conditions for a General NLPP with $m(<n)$ Constraints* – Constrained Optimization with Inequality Constraints – Kuhn Tucker Condition for a General NLPP with $m(<n)$ Constraints.

UNIT V

15Hrs

Games and Strategies: Introduction – Two Person Zero Sum game – The Maximum Minimum Principle – Games with Saddle Points – *games without Saddle Points* – Mixed Strategies – Graphical Solution of $2 \times n$ and $m \times 2$ Games.

Note: *Italics* denotes Self Study Topics

TEXT BOOK

1. **Kantiswarup, Gupta P.K, Man Mohan,** *Operations Research*, Sultan Chand & Sons, New Delhi, 14th Edition, 2009.

REFERENCE BOOKS

1. **Frederick Hillier, Gerald J Liberman,** *Introduction to Operations Research* , Tata McGraw Hill Publications Company Ltd., New Delhi, 5th Edition, 1990.
2. **Hamdy A.Taha,** *Operations Research: An Introduction*, Prentice Hall of India Pvt. Ltd., 7th Edition, 2003.
3. **Sharma J K,** *Operations Research: Problems and Solutions*, Macmillan India Ltd., 3rd Edition, 2009.

- Question paper setters confine to the above text book only.

SEMESTER – VI
SKILL BASED SUBJECT – IV
DISCRETE MATHEMATICS

Instructional Hrs: 45

Sub. Code: 11MCUS604

Max. Marks: CIA _25; ESE _75

Credits: 3

Objectives: On successful completion of this course the students should have gained knowledge about developing Mathematical Logic, Set Theory, Lattices and Graph Theory.

UNIT I

9 Hrs

Mathematical Logic: Connectives : Negation Conjunction – Disjunction – Statement Formulas and Truth Tables – Conditional and Biconditional.

UNIT II

9 Hrs

Mathematical Logic: Normal forms: Disjunctive Normal Forms – Conjunctive Normal Forms – Principal Disjunctive Normal Forms – Principal Conjunctive Normal Forms.

UNIT III

9 Hrs

Set Theory: Basic Concepts of Set Theory – Notation – Inclusion of Equality of Sets – The Power Set – Some Operation on Sets – Venn Diagrams – Some Basic Set Identities.

UNIT IV

9 Hrs

Lattices: Lattices as Partially Ordered Sets – Definition and Examples – Some Properties of Lattices – Some Special Lattices.

UNIT V

9 Hrs

Graph Theory: Basic Concepts of Graph Theory – Basic Definitions – Paths, Reachability – Connectedness.

TEXT BOOK

1. **Tremolay J.P., Manohar R.P.,** *Discrete Mathematical Structures with Applications to Computer Science*, MCGraw Hill, 1975.

Unit I : Chapter 1: Sections: 1_2.1 _1_2.4, 1_2.6.

Unit II : Chapter 1: Sections : 1_3.1 – 1_3.4.

Unit III : Chapter 2: Sections : 2_1.1 – 2_ 1.6

Unit IV : Chapter 4: Sections : 4_1.1 – 4_1.2, 4_1.5.

Unit V : Chapter 5 : Sections : 5_1.1 – 5_1.2.

REFERENCE BOOKS

1. **Sem M.K.,Chakrabonty B.C.,** *Introduction To Discrete Mathematics*, Arunabha Sen Books and Allied (Pvt.) Ltd., 2nd Edition,2002.
2. **Sharma. J.K.,** *Discrete Mathematics*, Macmillan India Ltd., 2nd Edition, 2005.
3. **Sundaresan V., Ganapathy Subramanian K.S., Ganesan K.,** *Discrete Mathematics*, A.R Publications, 2000.

- Question paper setters confine to the above text book only.

SEMESTER – III
ALLIED PAPER
BASIC MATHEMATICS
(For Bio – Chemistry)

Instructional Hrs : 90

Sub.Code:15MCUA301

Max. Marks : CIA – 20; ESE – 55

Credits: 3

Objective : On successful completion of this course the students should have gained Knowledge about Diagrams & Graphs, statistics, Matrices, Differentiation and Integration of Algebraic, Exponential, Logarithmic and Trigonometric functions.

UNIT I

18 hrs

Diagrams & Graphs : Diagrams – Rules for Construction – Types of Diagrams – Drawing diagrams – Graphs – Graphs of Frequency Distribution.

UNIT II

18 hrs

Measures of Central Tendency : Mean – Median – Mode.

Measures of Dispersion : Range – Quartile Deviation – *Mean Deviation* – Standard deviation.

UNIT III

18 hrs

Simple Linear Correlation : Methods (Univariate Frequency Only) – Scatter Diagram – Karl Pearson's Coefficient of Correlation – *Spearman's Rank Correlation*.

Simple Linear Regression : Two Regression Lines – Methods of Forming the Regression Equations.

UNIT IV

18hrs

Matrices : Definition – *Order of a Matrix* – Types of Matrices – Matrix Operations I.

Determinants : Properties – Cramer's Rule – Product of Determinants – Minor & cofactor – Matrix Operations II – Inverse of a Matrix – Matrix method – Elementary operations – Rank.

UNIT V

18 hrs

Differentiation : Derivatives of Standard Functions from First Principle – Certain Rules of Differentiation – Simple problems – Chain Rule – Differentiation of Implicit Functions – Parametric Form – Value of a Derivative at Specified Values of x – Successive Differentiation.

Integration : Indefinite Integrals – Standard Forms – Determination of c – Definite Integrals – Method of Substitution – *Method of Partial Fractions* – Method of Integration by parts.

Note : *Italics* denotes Self Study Topics

TEXT BOOKS

1. **P.A.Navnitham.**, *Bussiness Mathematics & Statistics*, Jai Publishers, Trichy, Edition April 2012.

UNIT I : 98 – 128 & 131 – 146

UNIT II : 159 – 250 & 301 – 340

UNIT III : 503 – 521 & 540 – 553

UNIT IV : 147 – 190

UNIT V : 247 – 275 & 303 – 318

REFERENCE BOOKS :

1. **Singaravelu A.**, *Allied Mathematics*, Meenakshi Praders, Chennai, 1st Edition, 2001.
2. **Vittal P.R.**, *Allied Mathematics*, Margham Publications, Chennai, 2003.
3. **Vittal P.R.**, *Business Statistics*, Margham Publications, Chennai, 2004.

- Question paper setters confine to the above text books only

SELF LEARNING PAPER
VEDIC MATHEMATICS-II

Sub.Code: 15MCUSL03

Max. Marks : ESE – 100

Credits : 5

Objective : On successful completion of this course the students should have gained knowledge about doing calculations easily and quickly.

UNIT I

Actual applications of the Vedic sutras to concrete mathematical problems.

UNIT II

Arithmetical Computations.

UNIT III

Multiplication – Practical application in compound multiplications – Practice and proportion in compound multiplication.

UNIT IV

Division by the Nikhilam method _ Division by the Paravartya method.

UNIT V

Argumental division.

TEXT BOOK

1. **Jagadguru Swami Sri Bharati Krsna Tirthaji Maharaja, *Vedic Mathematics*.**

Unit I	: Chapter I
Unit II	: Chapter II
Unit III	: Chapter III
Unit IV	: Chapters IV & V
Unit V	: Chapter VI

- Question paper setters confine to the above text book only.

DEPARTMENT OF MATHEMATICS

B.SC. MATHEMATICS (CA)

Question Paper Pattern

CORE, ALLIED AND ELECTIVE PAPERS

Duration: 3.00 hrs

Marks: 75

Section_A

(10 x 1 = 10 marks)

Multiple Choice Questions – 10 (Two from each unit)

(Q. No 1_10)

Section_B

(5 x 5 = 25 marks)

Answer all the Questions (Either or pattern)

One Question from each unit

(Q. No 11_15)

Section_C

(5 x 8 = 40 marks)

Answer **five** out of **eight** Questions

At least **One** Question from each unit

(Q. No 16_23)

CORE PAPERS WITH PRACTICALS

Duration: 3.00 hrs

Marks: 55

Section_A

(10 x 1 = 10 marks)

Multiple Choice Questions – 10 (Two from each unit)

(Q. No 1_10)

Section_B

(5 x 3 = 15 marks)

Answer all the Questions (Either or pattern)

One Question from each unit

(Q. No 11_15)

Section_C

(5 x 6= 30 marks)

Answer **five** out of **eight** Questions

At least **One** Question from each unit

(Q. No 16_23)

Core Papers (Practical)

Question Paper Pattern for Practicals

Internal External – 2:3

Max Marks _100

Continuous Internal Assessment Marks : 40 Marks (Average of two practicals and one model practical examination)

External Practical Examination (90% of the Maximum Marks) : 54 Marks

Record Notebook (10% of the Maximum Marks) : 06 Marks

Core Papers (Practical)

Question Paper Pattern for Practicals

Internal External – 2:3

Max Marks _25

Continuous Internal Assessment Marks : 10 Marks (Average of two practicals and one model practical examination)

External Practical Examination (90% of the Maximum Marks) : 13 Marks

Record Notebook (10% of the Maximum Marks) : 02 Marks

SKILL BASED SUBJECTS I, III & IV

Five Questions out of Eight

(5 x 15 = 75 marks)

MULTI SKILL DEVELOPMENT PAPER

External Examination : 60 marks (Online Examination – Objective type)

Internal (Practicals) : 40 marks (Average of two practicals and one model practical examination)

Total : 100 marks

SELF LEARNING PAPERS AND NON – MAJOR ELECTIVE

Five Questions out of Eight

(5 x 20 = 100 marks)