

Department of Mathematics

B.Sc.,

M.Sc.,

M.Phil

B.C.A.

B.Sc., IT

**B.Sc.,
Mathematics**

THIAGARAJAR COLLEGE, MADURAI – 9.

(Re-Accredited with 'A' Grade by NAAC)

DEPARTMENT OF MATHEMATICS

(From 2014-17 batch onwards)

COURSE STRUCTURE

Semester – I

Course	Code No	Subject	Contact Hours / Week	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	P111	இக்கால இலக்கியம்	6	3	90	25	75	100
Part II	P211	English Through Prose	6	3	90	25	75	100
Core	MM11	Differential Calculus	5	4	75	25	75	100
Core	MM12	Algebra	5	4	75	25	75	100
Core Elective1	EMM11	Management Accounting	4	3	60	25	75	100
Value Education	VE1	Value Education-I	2	2	30	15	35	50
Environmental Studies	ES1	Environmental Studies	2	2	30	15	35	50
TOTAL			30	21				

Semester – II

Course	Code No	Subject	Contact Hours / Week	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	P121	பக்தி இலக்கியமும் சிற்றிலக்கியமும்	6	3	90	25	75	100
Part II	P221	English Through Drama	6	3	90	25	75	100
Core	MM21	Integral Calculus	5	4	75	25	75	100
Core	MM22	Differential Equations and Applications	6	5	90	25	75	100
Core	MM23	C Programming	5	4	75	25	75	100
SBE	ESM21	Skill Based Elective1	2	2	30	15	35	50
TOTAL			30	21				

Semester – III

Course	Code No	Subject	Contact Hours / Week	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	P131	காப்பியஇலக்கியம்	6	3	90	25	75	100
Part II	P231	English through Poetry	6	3	90	25	75	100
Core	MM31	Sequences, Series and Trigonometry	4	4	60	25	75	100
Core Elective 2	EMM31	Elective - II	4	3	60	25	75	100
Allied	AM31(P)	Allied Physics - I	4	4	60	25	75	100
Allied	-	Allied Physics Practical	2	-	30	-	-	-
Value Education	VE 2	Value Education -II	2	2	30	15	35	50
Non Major Elective	ENM31	Mathematical Aptitude for Competitive Examinations	2	2	30	15	35	50
TOTAL			30	21				

Semester – IV

Course	Code No	Subject	Contact Hours / Week	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Part I	P141	பண்டை இலக்கியம்	6	3	90	25	75	100
Part II	P241	English through Fiction	6	3	90	25	75	100
Core	MM41	Mechanics	4	4	60	25	75	100
Core Elective 3	EMM41	Elective - III	4	3	60	25	75	100
Allied	AM41(P)	Allied Physics - II	4	4	60	25	75	100
Allied	AML41(P)	Allied Physics - Practical	2	2	30	25	75	100
Skill Based Elective	ESM41	Skill Based Elective-II	2	2	30	15	35	50
Non Major Elective	ENM41	Mathematical Logic	2	2	30	15	35	50
TOTAL			30	23				

Semester – V

Course	Code No	Subject	Contact Hours / Week	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core	MM51	Abstract Algebra	6	6	90	25	75	100
Core	MM52	Real Analysis	6	6	90	25	75	100
Core	MM53	Operations Research - I	5	4	75	25	75	100
Core	MM54	Statistics - I	5	4	75	25	75	100
Allied	AM51(C)	Allied Chemistry - I	4	4	60	25	75	100
Allied	-	Allied Chemistry - Practical	2	-	30	-	-	-
Value Education	VE 3	Value Education -3	2	2	30	15	35	50
Self Study Paper		Quantitative Aptitude	-	(Extra 5)*	-	-	100	100
TOTAL			30	26				

* Carries Extra 5 credits that do not form part mandatory credits (140) required for completion of the course.

Semester – VI

Course	Code No	Subject	Contact Hours / Week	Credits	Total No. of Hours Allotted	Max. Marks CA	Max. Marks SE	Total
Core	MM61	Complex Analysis	6	6	90	25	75	100
Core	MM62	Graph Theory	6	5	90	25	75	100
Core	MM63	Operations Research - II	5	4	75	25	75	100
Core	MM64	Statistics - II	5	4	75	25	75	100
Allied	AM61(C)	Allied Chemistry - II	4	4	60	25	75	100
Allied	AML61(C)	Allied Chemistry - Practical	2	2	30	25	75	100
Skill Based Elective	SBE 3	SBE - III	2	2	30	15	35	50
Part V				1				
TOTAL			30	28				
TOTAL CREDITS FOR SEMESTERS I to VI				140				

List of Non Major Elective papers (NME) (2 Hours /week)

- 1) Mathematical Aptitude for competitive Examinations (For semester – III)
- 2) Mathematical Logic (For semester – IV)

List of Elective papers (4 Hours / week)

(One elective paper to be chosen in each of I, III and IV semesters)

- 1) Analytical Geometry of 3D and Vector Calculus
- 2) Stochastic Processes
- 3) Numerical Methods
- 4) Fuzzy sets
- 5) Computer Algorithms
- 6) Data Mining
- 7) Mathematical Modelling
- 8) Fractal Geometry
- 9) Management Accounting

List of Skill Based Elective papers (SBE) (2 Hours / week)

(One elective paper to be chosen in each of II, IV and VI semesters)

- 1) C - Programming – Practical
- 2) Numerical Methods – Practical
- 3) Graph Theory – Practical
- 4) Web Designing with HTML - Practical
- 5) Theory of Numbers
- 6) Statistical Test of Significance
- 7) Z and Fourier Transforms
- 8) Theory of Lattices

Self study paper:

Quantitative Aptitude

A) CONSOLIDATION OF CONTACT HOURS AND CREDITS: UG

Semester	Contact Hrs/ Week	Credits
I	30 hrs.	21
II	30 hrs.	21
III	30 hrs.	21
IV	30 hrs.	23
V	30 hrs.	26
VI	30 hrs.	27
Part – V	--	1
Total	180 hrs	140

B) Curriculum Credits: Part wise

Part I	Tamil	4x3 = 12 Credits
Part II	English	4x3 = 12 Credits
Part III	Core	= 68 Credits (8+13+4+4+20+19)
	Allied	5x4 = 20 Credits
	Core Electives	3x3 = 09 Credits
Part IV	Value Education	3x2 = 06 Credits
	Environmental studies	1x2 = 02 Credits
	Skill Based Electives	3x2 = 06 Credits
	Non – Major Electives	2x2 = 04 Credits
Part V		1x1 – 01 Credits
Total		140 Credits

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Course : B.Sc. Code No. : MM11
 Semester : I No. of hours allotted : 5
 Paper : Core 1 No. of credits : 4
 Title of the Paper : **Differential Calculus**

Course objective:

To develop problem solving skills and study the applications of differential calculus

Unit - I (18 Hours)

Continuous functions – Algebra of continuous functions – Types of discontinuities – Properties of continuous functions - Differentiability - Algebra of derivatives – Derivatives of standard functions - The Chain rule for differentiation - Differentiation of inverse function – n^{th} derivative of some standard functions.

Unit - II (15 Hours)

Leibnitz's theorem for n^{th} derivative of a product - Partial derivatives – Homogeneous functions and Euler's theorem.

Unit - III (15 Hours)

Multiple points of a curve - Asymptotes - Method of finding asymptotes for the curve $y = f(x)$ - Method of finding asymptotes for the curve $f(x, y) = 0$.

Unit - IV (12 Hours)

Curvature - Evolutes - Envelope.

Unit - V (15 Hours)

Maxima and minima of functions of two variables - Lagrange's method of Undermined multipliers.

Text Books :

- 1) Calculus, Arumugam and Issac,
New Gamma publishing House, 1995
- 2) Calculus – Volume I, S. Narayanan, T.K. Manicka Vasagam Pillay,
S. Viswanathan Pvt. Ltd., 1997

Unit	Book	Chapter/section
I	1	2.1 – 2.5, 3.1 – 3.5, 3.12
II	1	3.13 – 3.15
III	1	10.2, 11.1 – 11.2
IV	1	8 and 9(Full)
V	2	8.4, 8.5

Reference Books :

- 1) Differential Calculus – Shanti Narayan,
S. Chand and Company Ltd., 14th Edition, Reprint 2002
- 2) Calculus – P.R. Vittal and V. Malini
Margham Publications, Third Edition, Reprint 2012.
- 3) Calculus – Vol. I – Tom M. Apostol, Wiley Student publication, 2007

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Course : B.Sc. Code No : MM12
 Semester : I No. of hours allotted : 5
 Paper : Core 2 No. of credits : 4
 Title of the paper: **Algebra**

Course objective:

- To study various methods of solving equations.
- To study inequalities and their importance in Mathematics.

Unit – I (15 Hours)

Binomial theorem for a rational index – Some important particular cases of binomial expansion – Sign of terms in the binomial expansion – Numerically greatest term – Expansion by splitting the term by Partial fractions – Application of the binomial theorem to Summation of series.

Unit – II (15 Hours)

Exponential limit – Exponential theorem – Summation of series – Expansion of a function in two different ways – The Logarithmic series : Theorem – Modification of log series – Different forms of logarithmic series – Euler’s constant – Summation of series.

Unit – III (15 Hours)

Relations between the roots and coefficients of equations–Symmetric function of the roots–Sum of the powers of the roots of an equation – Newton’s theorem on the sum of powers of the roots

Unit – IV (15 Hours)

Transformations of equations –Reciprocal equation–To increase or decrease the roots of a given equation by a given quantity–Form of the quotient and remainder when a polynomial is divided by a binomial–Descartes’ Rule of signs–Rolles’ Theorem

Unit – V (15 Hours)

Multiple roots–Horner’s Method–Graphical solutions of numerical equations–Cubic equations–Biquadratic equations

Text Book :

Algebra – Vol – 1, T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy, S.Viswanathan (printers and publishers), Pvt., LTD., 2010

Unit	Chapter/ Section
I	3(3.5 – 3.10)
II	4(4.1 – 4.9)
III	6(6.11-6.14)
IV	6(6.15-6.18, 6.24,6.25)
V	6(6.26,6.30-6.33)

Reference Books:

- 1) Algebra – S. Arumugam and Isaac, New Gamma publications, 2006
- 2) Theory and Application of infinite series – Konard Knoop, Blackie and son Ltd., 1964

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Course : B.Sc. Code No. : MM21
 Semester : II No. of hours allotted : 5
 Paper : Core 3 No. of credits : 4
 Title of the Paper : **Integral Calculus**

Course objective: To develop problem solving skills in Calculus and study the applications of integral calculus

Unit - I (18 Hours)

Integration by parts - Bernoulli's formula - Reduction formula - Improper integrals - Some tests for convergence of improper integrals - Evaluation of some improper integrals.

Unit - II (18 Hours)

Double integral - Evaluation of double integral - Triple integral - Jacobians - Change of variables in double and triple integrals.

Unit - III (12 Hours)

Beta and Gamma functions - Properties and results involving Beta and Gamma functions.

Unit - IV (15 Hours)

Area as double integral - Volume as triple integral - Area of surface.

Unit - V (12 Hours)

Centre of mass - Moment of inertia.

Text Book :

Calculus volume II - Arumugam and Issac,
 New Gamma publishing House, 1998

Unit	Chapter/section
I	2.7 – 2.8, 3.1 – 3.3
II	4(Full)
III	5(Full)
IV	6.2, 6.5, 6.6
V	6.7, 6.8

Reference Books:

- 1) Integral Calculus, Shanti Narayan,
S. Chand and Company Ltd., 9th Edition, Reprint 2002
- 2) Calculus – P.R. Vittal and V. Malini
Margham Publications, Third Edition, Reprint 2012.
- 3) Calculus – Vol. II – Tom M. Apostol, Wiley Student publication, 2007

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Course : B.Sc. Code No : MM22
Semester : II No. of hours allotted : 6
Paper : Core 4 No. of credits : 5
Title of the Paper : **Differential Equations and Applications**

Course objective:

1. To expose the students to various methods of solving different kinds of differential equations.
2. To expose the students how to apply their knowledge in Differential Equations to other branches of sciences.

Unit – I (18 Hours)

Differential Equations of First Order : Differential Equation – Equations of first order and first degree – Exact differential Equations – Integrating factors – Linear equations – Bernoulli’s equations – Equations of first order and higher degree.

Unit – II (18 Hours)

Linear Equations of Higher order : Linear equations with constant coefficients – Method of finding complementary functions – Method of finding particular integrals - Homogeneous linear equations – Linear equations with variable coefficients – Simultaneous linear differential equations – Total differential equations.

Unit – III (18 Hours)

Laplace Transform : Laplace transform – Inverse Laplace transform – Solution of differential equation using Laplace transform.

Unit – IV (18 Hours)

Partial Differential Equations : Formation of partial differential equations – First order partial differential equations – Methods of solving first order partial differential equations – Some standard forms – Charpit’s Method.

Unit – V (18 Hours)

Applications of Differential Equations : Orthogonal trajectories – Growth and decay – Continuous compound interest – The Brachistochrone problem – Simple electric circuits – Falling bodies – Simple harmonic motion – Central forces – Planetary motion.

Text Book: Differential Equations and Applications – Arumugam & Isaac,
New Gamma Publishing House – 2011.

Unit	Chapter/section
I	1 (Section 1.1 to 1.7)
II	2(Section 2.1 to 2.7)
III	3(Section 3.1 to 3.3)
IV	4(Section 4.1 to 4.5)
V	6(Section 6.1 - 6.4, 6.6 - 6.8, 6.10, 6.11)

Reference Books :

- 1) Differential Equations and its Applications– S. Narayanan and T. K. Manicavachagam, S. Viswanathan (printers & publishers) Pvt. Ltd., 1996
- 2) Differential Equations – Gupta, Malik and Mittal
Pragati Prakashan, Fourth Edition, 1997
- 3) Differential Equations – Richard Bronson
Schaum’s Outline Series, McGraw Hill, Second Edition, 1994

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Course : B.Sc. Code : MM23
Semester : II No. of Hours allotted : 5
Paper : Core 5 No. of Credits : 4
Title of the Paper : **C- Programming**
Course Objective : To develop logical and programming skills using C.

Unit - I **(15 Hours)**

Overview of C: History of C–Importance of C–Sample programs–Structure of a C program – Programming style – Executing a C program – Unix and Ms – Dos systems
Constants, Variables and Data types: Introduction – Character set – C Tokens – Keywords and identifiers – Constants , Variables and Data types – Declaration of variables and storage class – Assigning values to variables –Defining Symbolic constants - Declaring a variable as constant – Declaring a variable as volatile – Overflow and underflow of data.

Unit - II **(15 Hours)**

Operators and Expressions: Introduction - Arithmetic , Relational Logical and Assignment operators – Increment and Decrement operators – Conditional operator – Bitwise operators – Special operators – Arithmetic expressions – Evaluation of Expressions – Precedence of Arithmetic Operators – Some computational problems – Type conversions in Expressions – Operator precedence and Associativity – Mathematical functions Managing Input and Output operations: Introduction – Reading and writing a character – Formatted input and output

Unit - III **(15 Hours)**

Decision Making and Branching: Introduction –Decision Making with IF statement– Simple IF statement-The IF...ELSE statement-Nesting of IF ..ELSE statements–The ELSE IF Ladder–The Switch statement–The?: operator–The GOTO statement. Decision Making and Looping:Introduction–WHILE, DO and FOR statements–Jumps in Loops-Concise test Expression

Unit - IV **(15 Hours)**

Arrays : Introduction – One dimensional arrays – Declaration of One – dimensional arrays – Initialization of One dimensional arrays – Two dimensional arrays – Initializing two dimensional arrays – Multi dimensional arrays – Dynamic arrays – More about arrays .
Character Arrays and Strings: Introduction – Declaring and Initializing String variables – Reading Strings from terminal – Writing strings to screen – Arithmetic operations on characters – Putting strings together – Comparison of two strings – String handling functions – Table of Strings – Other features of strings

Unit - V **(15 Hours)**

User Defined functions: Introduction – Need for user defined functions – A Multi function program – Elements of user defined functions – Definition of functions – Return values and their types – Function calls – Function declaration –Five different categories of functions – Nesting of functions – Recursion – Passing arrays and strings to functions – The scope , visibility and Lifetime of variables – Multiline programs. Structures and Unions: Introduction – Defining a Structure – Declaring Structure variables – Accessing Structure Members – Structure initialization – Copying and Comparing Structure variables – Operations on Individual Members – Arrays of Structures – Arrays within Structures – Structures within Structures – Structures and Functions – Unions – Size of Structures – Bit fields. Pointers: Introduction – Understanding pointers – Accessing the Address of a variable- Declaring Pointer variables – Initialization of pointer variables – Accessing a variable through its pointer

Text Book:

Programming in ANSI C – E . Balagurusamy, Tata McGraw Hill Pvt. Ltd., 5th Edition 2011

Unit	Chapter
I	1 and 2
II	3 and 4
III	5 and 6
IV	7 and 8
V	9, 10 and 11(11.1-11.6)

Reference Books:

- 1) Programming with ANSI and Turbo C–Ashok N Kamthane, Pearson Education Pvt Ltd, 2009
- 2) Programming with C–K.R.Venugopal, Sudeep R.Prasad, Tata McGraw-Hill Publishing Company limited, 2005
- 3) Computer Concepts and C Programming, R.Rajaram, Scitech Publications, 2001

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Course : B.Sc. Code No : MM31
Semester : III No. of hours allotted : 4
Paper : Core 6 No. of credits : 4
Title of the Paper : **Sequences, Series and Trigonometry**

Course objective: To introduce the convergence and divergence of sequences and series.
To introduce the expansions of trigonometric functions.

Unit - I (12 Hours)

Sequences – Bounded sequences – monotonic sequences – convergent sequences - divergent and oscillating sequences – Algebra of limits.

Unit - II (12 Hours)

Behaviour of Monotonic Sequences - Some theorems on limits – Subsequences – Limit points – Cauchy sequences – The upper and lower limits of a sequence.

Unit - III (12 Hours)

Infinite Series – Comparison Test – Kummer’s Test – Root Test and Condensation Test – Integral Test.

Unit - IV (12 Hours)

Alternating series – Absolute Convergence – Tests for Convergence of Series of arbitrary terms- Rearrangement of Series.

Unit - V (12 Hours)

Expression for $\sin n\theta$, $\cos n\theta$, $\tan n\theta$, $\sin^n \theta$, $\cos^n \theta$ – Expansion of $\sin \theta$, $\cos \theta$, $\tan \theta$ in powers of θ - Hyperbolic functions - - Inverse Hyperbolic functions

- Text Books:** 1) Sequences and Series - Arumugam and Issac,
New Gamma Publishing House, 2012.
2) Algebra : Theory of Equations, Theory of Numbers and Trigonometry
- Arumugam and Issac – New Gamma Publishing House – 2011.

Unit	Book	Chapter/section
I	1	3.0 – 3.6
II	1	3.7 – 3.12
III	1	4 (Full)
IV	1	5 (5.1 – 5.4)
V	2	6 (Full) & 7 (Full)

Reference Books :

- 1) Algebra Volume I - T.K.M. Pillai, T. Natarajan and K.S. Ganapathy
S. Viswanathan Publishers, 2008
- 2) Trigonometry - S. Narayanan and T.K. Manickavachagom Pillay
S. Viswanathan Publishers, 1986
- 3) Trigonometry – K.S. Rawat
Sarup and Sons, First Edition, 2005

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Course : B.Sc. Code No. : MM41
Semester : IV No. of hours allotted : 4
Paper : Core 7 No. of credits : 4
Title of the Paper : **Mechanics**

Course objective: To introduce the basic laws, principles and postulates governing static and dynamic systems.

Unit - I Forces acting at a point (12 Hours)

Definition – Resultant – Parallelogram of forces – Resultant of two forces – Triangle law of forces – Perpendicular triangle of forces – Polygon of forces – Lami’s theorem – Extended form of the parallelogram law of forces – Components of a force along two given directions – Resultant of any number of forces – Resultant of any number of forces - Condition of equilibrium of any number of forces acting upon a particle.

Unit - II Friction (12 Hours)

Introduction – Experimental results – Statical , dynamical and limiting friction – Laws of friction – Friction-a passive force – Coefficient of friction – Angle of friction – Cone of friction – Numerical values – Equilibrium of a particle on a inclined plane under a force parallel to the plane – Equilibrium of a body on a rough inclined plane under any force – Problems on friction.

Unit - III Projectiles (12 Hours)

Definitions – Two fundamental principles - Path of a projectile is a parabola – Characteristic of the motion of a projectile – Maximum horizontal range – The number of possible projections to reach the given range and a given point – Velocity at the end of time ‘t’ – Range on the inclined plane – Motion on the surface of smooth inclined plane.

Unit - IV Collision of elastic bodies (12 Hours)

Introduction - Definition – Fundamental laws of impact – Impact of a smooth sphere on a fixed smooth plane – Direct impact of two smooth spheres - Oblique impact of two smooth spheres – Loss of kinetic energy due to oblique impact of two smooth spheres.

Unit - V Simple harmonic motion (12 Hours)

Introduction – Simple harmonic motion in a straight line – General solution of simple harmonic motion equation – Geometrical representation of SHM – Change of origin – Composition of two simple harmonic motion of same period in the same straight line – Composition of two simple harmonic motion of same period in the two perpendicular directions – Simple pendulum – Period of oscillation of a Simple pendulum – Equivalent Simple pendulum – The seconds Simple pendulum - Loss or gain in the number of oscillation.

Text Books:

- 1) Statics - Dr. M.K. Venkataraman, Agasthiar publications, 2012
- 2) Dynamics -Dr. M.K. Venkataraman, Agasthiar publications, 2012

Unit	Book	Chapter/Section
I	1	2.1 – 2.16
II	1	7.1 – 7.13
III	2	6.1 – 6.16
IV	2	8.1 – 8.9
V	2	10.1 – 10.7, 10.12 – 10.16

Reference books:

- 1) Dynamics - M.L. Khanna, Pragati Pragasam Ltd., 1998
- 2) Statics - M.L. Khanna, Pragati Pragasam Ltd., 1998
- 3) Mechanics
– P. Duraipandian, Laxmi Duraipandian and Muthamizh Jeyapragasam,
S. Chand and Company Ltd., Reprint 2012

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Course : B.Sc. Code No. : MM51
Semester : V No. of hours allotted : 6
Paper : Core 8 No. of credits : 6
Title of the Paper : **Abstract Algebra**

Course objective: To study the theory related with theorem so that the students may cope-up with the higher studies in Algebraic systems

Unit - I (20 Hours)

Group - Elementary properties of a group - Equivalent definitions of a group - Permutation groups - Subgroups - Cyclic groups – Order of an element - Cosets and Lagrange's theorem.

Unit - II (16 Hours)

Normal subgroups and quotient groups - Isomorphism - Homomorphism.

Unit - III (18 Hours)

Ring – Elementary properties of Rings - Isomorphism - Types of Rings - Characteristic of a Ring - Subrings - Ideals - Quotient Rings - Maximal and Prime ideals - Homomorphism of Rings.

Unit - IV (16 Hours)

Field of quotients of an integral domain - Ordered integral domain – Unique Factorization Domain - Euclidean domain.

Unit - V (20 Hours)

Vector space – Definition and examples – Subspaces - Linear transformations – Span of a set - Linear independence - Basis and dimension – Definition and examples of inner product space - Orthogonality.

Text Book: Modern Algebra – Arumugam. S and Isaac. A.T.
SCITECH publications(India) pvt. Ltd., 2003

Unit	Chapter/Section
I	3.1 – 3.8
II	3.9 – 3.11
III	4.1 – 4.10
IV	4.11 – 4.14
V	5.1 – 5.6, 6.1 – 6.2

Reference Books:

- 1) Topics in Algebra -I.N. Herstein,
Wiley India Pvt. Ltd, Second Edition, Reprint 2012
- 2) Linear Algebra – Kenneth Hoffman and Ray Kunze
PHI Learning Pvt. Ltd., Second Edition, 2009.
- 2) A course in Abstract Algebra – Vijay K Khanna and S.K. Bhambri
Vikas Publishing House Pvt. Ltd., 3rd Edition, Reprint 2011

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Course : B.Sc. Code No : MM52
Semester : V No. of hours allotted : 6
Paper : Core 9 No. of credits : 6
Title of the Paper : **Real Analysis**

Course objective: To acquire knowledge in countable and uncountable sets, inequalities, Metric spaces, continuity, completeness and connectedness of metric spaces.

Unit - I (18 Hours)

Preliminaries : Sets and Functions – Countable sets – Uncountable sets – Inequalities of Holder and Minkowski.

Unit - II (18 Hours)

Metric Spaces : Definitions and Examples – Bounded Sets in a Metric Space – Open Ball in a Metric Space – Open Sets – Subspaces – Interior of a Set – Closed Sets – Closure – Limit Point – Dense Sets.

Unit - III (18 Hours)

Complete Metric Space and Continuity : Introduction – Completeness – Baire’s Category Theorem - Continuity – Homeomorphism – Uniform Continuity – Discontinuous Functions on \mathbb{R} .

Unit – IV (18 Hours)

Connectedness : Introduction –Definition and Examples – Connected Subsets of \mathbb{R} – Connectedness and Continuity.

Unit - V (18 Hours)

Compactness : Introduction – Compact Space – Compact Subsets of \mathbb{R} – Equivalent Characterization for Compactness – Compactness and Continuity.

Text Book : Modern Analysis - S. Arumugam and A. Thangapandi Isaac,
New Gamma Publishing House, 2012.

Unit	Chapter/section
I	1 (Full)
II	2 (Full)
III	3 (Full) & 4 (Full)
IV	5 (Full)
V	6 (Full)

Reference Books :

- 1) Methods of Real Analysis - Goldberg, Oxford and IBH Publishing Company, 1970.
- 2) Real Analysis – V. Karunakaran, Pearson Education India, 2012
- 3) Real Analysis – Hari Kishan , Pragati Prakashan, 4th Edition, 2012

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Course : B.Sc. Code No. : MM53
Semester : V No. of hours allotted : 5
Paper : Core 10 No. of credits : 4
Title of the Paper : **Operations Research - I**

Course objective:

- To know the origin and development of Operations Research.
- To develop the skills of formulation of LPP and different techniques to solve it.
- To know the application of Transportation and Assignment problems.

Unit – I (15 Hours)

Linear Programming Problem- Mathematical Formulation: Introduction – Linear Programming Problem – Mathematical Formulation of the Problem – Illustration on Mathematical Formulation of LPPs. Linear Programming Problem – Graphical solution and extension: Introduction - Graphical Solution Method – Some Exceptional Cases-General Linear Programming Problem – Canonical and Standard Forms of LPP – Insights into the Simplex method.

Unit – II (15 Hours)

Linear Programming Problem- Simplex Method : Introduction – Fundamental Properties of Solutions- The Computational Procedure- Use of Artificial Variables- Degeneracy in Linear Programming -Solution of Simultaneous Linear Equations- Inverting a Matrix Using Simplex Method.

Unit – III (15 Hours)

Duality in Linear Programming : Introduction – General Primal – Dual Pair – Formulating a dual Problem – Primal – Dual Pair in Matrix Form – Duality theorems – Complementary Slackness Theorem - Duality and Simplex Method – Dual Simplex Method.

Unit – IV (15 Hours)

Transportation Problem : Introduction - LP Formulation of the Transportation Problem - The Transportation Table- Loops in Transportation Table-Solution of a Transportation Problem-Finding an Initial Basic feasible Solution- Test for Optimality – Degeneracy in Transportation Problem - Transportation Algorithm (MODI Method).

Unit – V (15 Hours)

Assignment Problem : Introduction-Mathematical Formulation of the Problem – Solution Methods of the Assignment method – Special Cases in Assignment Problem-The Travelling Salesman Problem.

Text Book: Operations Research – Kanti Swarup, P. K. Gupta, Man Mohan Sultan Chand & Sons, Reprint 2013

Unit	Chapter/section
I	2(2:1 – 2:4), 3(3:1 – 3:6)
II	4(4:1 – 4:7)
III	5(5:1 – 5:7, 5:9)
IV	10 (10:1, 10:2, 10:5, 10:6, 10:8 – 10:10, 10:12,10:13)
V	11(11:1 – 11:4, 11:7)

Reference Books :

- 1) Operations Research – S.D. Sharma, Kedar Nath Ramnath & Co. 13th Edition, 2002
- 2) Operations Research – B.S. Goel and S.K. Mittal, Pragati Prakashan, 15th Edition, 1997
- 3) Operations Research – S. Kalavathy, Vikas Publishing House Pvt. Ltd., 2nd Edition, 2002

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DEPARTMENT OF MATHEMATICS
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Course : B.Sc. Code No : MM54
Semester : V No. of hours allotted : 5
Paper : Core 11 No. of credits : 4
Title of the Paper : **Statistics - I**

Course objective: To acquire various skills about basic statistical concepts and to know fitting statistical data in various distributions.

Unit - I (15Hours)

Correlation and Regression : Introduction – Correlation – Rank Correlation – Regression – Correlation Coefficient for a Bivariate Frequency Distribution.

Unit - II (15 Hours)

Index numbers : Index numbers – Weighted Index numbers – Consumer Price Index numbers – Conversion of chain base Index number into fixed base index and conversely

Unit – III (15Hours)

Analysis of Time Series : Introduction – Time series – components of a time series – Measurement of trends

Unit - IV (15Hours)

Random Variables : Introduction – Random Variables – Discrete Random Variables – Continuous Random Variables – Mathematical Expectations – Mathematical Expectation of Continuous Random Variable – Moment Generating Function – Characteristic Function

Unit - V (15Hours)

Some Special Distributions : Introduction – Binomial Distribution – Poisson Distribution – Normal Distribution

Text Book :

Statistics - S. Arumugam and A. Thangapandi Isaac,
New Gamma Publishing House, 2011.

Unit	Chapter/section
I	6 (Full)
II	9 (Full)
III	10 (Full)
IV	12 (Full)
V	13 (13 .0-13.3)

Reference Books :

- 1) Fundamentals of Mathematical Statistics - S. C. Gupta and V.K. Kapoor, Sultan Chand & Sons, 11th thoroughly Revised edition, 2002
- 2) Fundamentals of Statistics – D.N. Elhence and Veena Elhence, Kitab Mahal, 1988
- 3) Advanced Practical Statistics – S.P. Gupta, S. Chand and Company Pvt. Ltd., 1988

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Course : B.Sc. Code No. : MM61
Semester : VI No. of hours allotted : 6
Paper : Core 12 No. of credits : 6
Title of the Paper : **Complex Analysis**

Course objective: To introduce the concepts of an analytic function, bilinear transformations, contour integration and Taylor and Laurent’s series expansions

Unit - I (18 Hours)

Analytic functions : Functions of a complex variable – Limits – Theorems on limit – Continuous functions – Differentiability – C-R Equations –Analytic functions – Harmonic functions – Conformal mapping.

Unit – II (18 Hours)

Bilinear transformations : Elementary transformations – Bilinear transformations – Cross Ratio – Fixed points of Bilinear transformations – Some special bilinear transformations – Mapping by elementary functions : The mapping $W=Z^2$ – The mapping $W = e^Z$ – The mapping $W = \sin Z$ – The mapping $W = \frac{1}{2}(z + 1/z)$.

Unit - III (18 Hours)

Complex integration : Definite integral - Cauchy’s theorem (statement only) – Cauchy integral formula – Higher derivatives.

Unit – IV (18 Hours)

Series expansions : Taylor series – Laurent’s series – Zeros of an analytic functions – Singularities.

Unit - V (18 Hours)

Calculus of residues : Residues – Cauchy’s residue theorem – Evaluation of definite integrals.

Text Book :

Complex Analysis - S. Arumugam A. Thangapandi Issac and A. Somasundaram, SciTech publications , 2002

Unit	Chapter/Section
I	2(2.1 – 2.9)
II	3(3.1 – 3.5) 5(5.1, 5.3, 5.4, 5.6)
III	6(6.1 – 6.4)
IV	7(7.1 – 7.4)
V	8(8.1 – 8.3)

Reference books :

- 1) Complex analysis - T.K. Manickavasagam Pillay and S. Narayanan, S. V. Publishers, 2008
- 2) Complex analysis – V. Karunakaran, Narosa Publishing House Pvt. Ltd., Second Edition, 2006
- 3) Complex analysis – Serge Lang, Springer International Edition, First Indian Reprint 2005

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Course	: B.Sc.	Code No.	: MM62
Semester	: VI	No. of hours allotted	: 6
Paper	: Core 13	No. of credits	: 5
Title of the Paper	: Graph Theory		

Course objective: To study the basic concepts of Graph Theory such as Trees, planarity, Coloring, directed graphs and know the applications to Travelling Salesman Problem, teleprinter’s problem, maximum network flow and arborescences.

Unit - I **(18 Hours)**

What is a graph? - Application of graphs – Finite and Infinite graphs – Incidence and degree – Isolated Vertex, Pendant Vertex and Null graph - Brief history of graph theory- Isomorphism – Subgraphs – A puzzle with multicolored cubes -Walks, Paths and Circuits – Connected graphs, disconnected graphs and components - Euler graphs – Operations on graphs – More on Euler graphs - Hamiltonian Paths and Circuits – The Travelling Salesman Problem.

Unit - II **(18 Hours)**

Trees – Some properties of trees – Pendant Vertices in a tree – distance and centers in a tree – Rooted and Binary tree – On Counting trees - Spanning trees.

Unit - III **(18 Hours)**

Cut-Sets – Some properties of a cut set – All cut sets in a graph – Fundamental circuits and Cut-Sets - Connectivity and Separability – Network flows - Combinatorial Vs. Geometric graph - Planar graphs – Kuratowski’s two graphs - Different Representation of a planar graph.

Unit - IV **(18 Hours)**

Incidence matrix – Submatrices of $A(G)$ - Chromatic number – Chromatic partitioning – Chromatic Polynomial – Matching.

Unit - V **(18 Hours)**

What is a directed graph? – Some types of digraphs – Digraphs and binary relations – Directed paths and Connectedness – Euler Digraphs – Trees with directed edges.

Text Book: Graph Theory with Applications to Engineering and Computer Science
– Narsingh Deo, Prentice-Hall of India, 2001

Unit	Chapter
I	1, 2(2.1 – 2.10)
II	3(3.1 – 3.7)
III	4(4. 1 – 4. 6), 5(5.1 – 5.4)
IV	7(7.1, 7.2), 8(8.1 – 8.4)
V	9(9.1 – 9. 6)

Reference books :

- 1) Graph Theory- Harary F, Addison – Wesley Publishing Company, 1989
- 2) Introduction to Graph Theory – Gary Chartrand and Ping Zhang,
Tata McGraw-Hill, 2006
- 3) Introduction to Graph Theory – Douglas B. West, Prentice - Hall of India, 2001.

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DEPARTMENT OF MATHEMATICS
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Course : B.Sc. Code No. : MM63
Semester : VI No. of hours allotted : 5
Paper : Core 14 No. of credits : 4
Title of the Paper : **Operations Research - II**

Course objective: To understand Sequencing Problem, Queuing theory, Inventory control, Network and its Applications

Unit -I (15 Hours)

Sequencing Problem: Introduction - Problem of Sequencing - Basic Terms Used in Sequencing - Processing n Jobs through Two Machines - Processing n Jobs through k Machines - Processing 2 Jobs through k Machines.

Unit – II (15 Hours)

Games and Strategies : Introduction –Two - Person Zero – Sum Games – Some Basic Terms - The Maximin - Minimax Principle - Games without Saddle Points-Mixed Strategies - Graphic Solution of $2 \times n$ and $m \times 2$ Games - Dominance Property.

Unit –III (15 Hours)

Inventory Control -I : Introduction – Types of Inventories - Reasons for carrying Inventories - The inventory Decisions - Objectives of Scientific Inventory Control - Costs Associated with Inventories - Factors Affecting Inventory Control - An Inventory Control Problem - The Concept of EOQ - Deterministic Inventory Problems with No Shortages- Deterministic Inventory Problems with Shortages – Problem of EOQ with Price Breaks.

Unit – IV (15 Hours)

Queueing Theory : Introduction – Queueing System – Elements of a Queueing System Operating Characteristics of a Queueing System – Probability Distributions in Queueing System – Classification of Queueing Models – Definition of Transient and Steady States – Poisson Queueing Systems (Model I to V)

Unit –V (15 Hours)

Network Scheduling by PERT/CPM : Introduction – Network: Basic Components – Rules of Network Construction – Critical Path Analysis – Probability Consideration in PERT – Distinction between PERT and CPM.

Text Book: Operations Research – Kannti Swarup, P. K. Gupta and Man Mohan Sultan Chand & Sons, Reprint 2013

Unit	Chapter/section
I	12:1 – 12:6
II	17:1 – 17:7
III	19:1 – 19:12
IV	21:1 – 21:4, 21:6 – 21:9
V	25:1, 25:2, 25:4, 25:6, 25:7, 25:8

Reference Books :

- 1) Operations Research – S.D. Sharma, Kedar Nath Ramnath & Co. 13th Edition, 2002
- 2) Operations Research – B.S. Goel and S.K. Mittal, Pragati Prakashan, 15th Edition, 1997
- 3) Operations Research – S. Kalavathy, Vikas Publishing House Pvt. Ltd., 2nd Edition, 2002

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Course : B.Sc. Code No :MM64
Semester : VI No. of hours allotted : 5
Paper : Core 15 No. of credits : 4
Title of the Paper : **Statistics - II**

Course objective: To acquire various skills about sampling theory and applications of various statistical tests.

Unit - I (15 Hours)

Theory of attributes: Introduction – Attributes – Consistency of data Independence and association of data

Unit - II (15 Hours)

Tests of significance (large samples): Introduction – Sampling – Sampling distribution – Testing of hypothesis – Procedure for testing of hypothesis for large samples – Test of significance for large samples.

Unit - III (15 Hours)

Tests of significance (small samples): Introduction – Tests of significance based on t-distribution (t-test) – Test of significance based on F-test – Test of Significance of an observal sample correlation.

Unit - IV (15 Hours)

Test based on Chi square distribution: Introduction – Chi square test – Chi square test to test the Goodness of fit – Test for independence of attributes

Unit - V (15 Hours)

Analysis of variance: Introduction – One criterion of classification – Two criteria of classification – Three criteria of classification (Latin Square).

Text Book :

Statistics - S. Arumugam and A. Thangapandi Isaac,
New Gamma Publishing House, 2011

Unit	Chapter/section
I	8 (Full)
II	14 (Full)
III	15 (15.0 to 15.2)
IV	16 (Full)
V	17 (Full)

Reference Books :

- 1) Fundamentals of Mathematical Statistics - S. C. Gupta and V.K. Kapoor,
Sultan Chand & Sons, 11th thoroughly Revised edition, 2002
- 2) Fundamentals of Statistics – D.N. Elhence and Veena Elhence,
Kitab Mahal, 1988
- 3) Advanced Practical Statistics – S.P. Gupta,
S. Chand and Company Pvt. Ltd., 1988

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Course : B.Sc. Code No. : ENM31
Semester : III No. of hours allotted : 2
Paper : Non Major Elective No. of credits : 2
Title of the Paper : **Mathematical Aptitude for Competitive Examinations**

Course objective: To introduce the basic numeric concepts to the students so that they get confidence to face the competitive examinations

Unit - I **(15 Hours)**

H. C. F and L. C. M of Numbers – Decimal Fractions – Average – Percentage – Profit and Loss – Ratio and Proportion

Unit - II **(15 Hours)**

Time and Distance – Simple interest – Compound interest – Area – Volume and surface areas – True discount – Banker’s discount

Text Book:

Quantitative Aptitude - R. S. Agarwal, S. Chand and Co., Delhi, Reprint 2002

Unit	Chapter/section
I	2, 3, 6, 10, 11, 12
II	17, 21, 22, 24, 25, 30, 31

Reference Books :

- 1) **Quantitative Aptitude Mathematics Volume- 1** – Arora, P N and Arora S, S Chand & Company Ltd., 2009
- 2) **Quantitative Techniques**, C.R. Kothari
Vikas Publishing House Pvt. Ltd., Third Edition, First Reprint 1989
- 3) **Elements of Quantitative Techniques** – T.M. Srinivasan and S. Perumalswamy
MD Gopala Krishnan Emerald Publishers, 1985

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Course : B.Sc. Code : ENM41
Semester : IV No. of Hours allotted : 2
Paper : Non Major Elective No. of Credits : 2
Title of the Paper : **Mathematical Logic**

Course Objective: To introduce the concepts of Logic and Theory of inference.

Unit - I **(15 Hours)**

Introduction – TF Statements – Connectives – Atomic and Compound Statements – Well Formed (Statement) Formulae – Truth table of a formula

Unit - II **(15 Hours)**

Tautology – Tautological implications and equivalence of formulae – Theory of Inference

Text Book:

Discrete Mathematics
-Dr. M.K. Venkataraman, Dr. N. Sridharan and Dr. N. Chandrasekaran,
The National Publishing Company, Reprint, 2012

Unit	Chapter / Section
I	IX(1 – 6)
II	IX(7, 8, 13)

Reference Books:

- 1) Discrete Mathematical Structures with Applications to Compute Science,
- J.P. Trembley and R. Manohar,
Tata McGraw –Hill Publishing Company Limited, Fourteenth Reprint 2001.
- 2) Discrete Mathematics with Graph Theory and Combinatorics – T. Veerarajan,
Tata McGraw Hill Education Private Limited, 2010

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Course : B.Sc. Code No. :
Semester : I/III/IV No. of hours allotted : 4
Paper : Core Elective No. of credits : 3
Title of the Paper : **Analytical Geometry of 3D & Vector Calculus**

Course objective:

1. To expose various concepts of Analytical Geometry of 3D
2. To introduce to the students how to apply calculus to other branches of human knowledge such as vectors.

Unit - I (12 Hours)

Direction Cosines-Equation of a Plane-Transformation to the normal form-Angle between two planes-Angle bisectors of two planes.

Unit – II (12 Hours)

Equation of a straight line - Plane and a line-Equation of two skew lines in a simple form-The intersection of three planes-Volume of a tetrahedron.

Unit – III (12 Hours)

Equation of a sphere - Tangent line and Tangent plane –Intersection of two spheres-Plane sections of a sphere.

Unit – IV (12 Hours)

Vector Differentiation - Gradient-Geometrical Interpretation-Equation of the normal line-Angle between the surfaces - Divergence and curl.

Unit – V (12 Hours)

Vector Integration- Line integrals-surface integrals - Green’s theorem - Gauss’s Theorem, Stoke’s Theorem(Statement only- without proof).

Text Book:

Analytical Geometry of 3D and Vector Calculus
- Arumugam and Isaac, New Gamma publications, 2003

Unit	Chapter/Section
I	Chapter 1(Section 1.3); Chapter 2 (Sections 2.1 to 2.3)
II	Chapter 3 (Sections 3.1 to 3.5)
III	Chapter 4 (Sections 4.1 to 4.3)
IV	Chapter 5 (Sections 5.1 to 5.4)
V	Chapter 7 (Sections 7.1 to 7.3)

Reference Books:

- 1) A Text Book of Analytical Geometry(Two & Three dimension)
– T.K. Manikavachagam Pillay & Natarajan,
S. Viswanathan (Printers & Publishers) Ltd., 1997.
- 2) Vector Algebra & Analysis
- S. Narayanan & T. K. Manikavachagam Pillay
S. Viswanathan (Printers & Publishers) Ltd., 1995
- 3) A text book of Vector Analysis and Geometry
– H.D. Pandey. S.K.D. Dubey and S.N. Pandey
Wisdom Press, 2011

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Course : B.Sc. Code No. :
Semester : I/III/IV No. of hours allotted : 4
Paper : Core Elective No. of credits : 3
Title of the Paper : **Stochastic Processes**

Course objective : To expose the students to various concepts of Stochastic Process and its applications to real time problem.

Unit – I (12 Hours)

Generating functions-Laplace Transforms - L.T of probability Distribution of a random variable - Difference Equations - Difference equations in probability Theory - Differential Difference Equations.

Unit - II (12 Hours)

Matrix Analysis-Notation of Stochastic Process - Specification of Stochastic Process - Stationary Processes.

Unit – III (12 Hours)

Definitions and example - Higher Transition Probability Classification of states and chains - Determinations of Higher Transition Probabilities.

Unit – IV (12 Hours)

Stability of a Markov System - Limiting behavior statistical Inference for Markov Chains - Markov Chains with continuous state space - Non-stationary or Non-homogeneous chains.

Unit – V (12 Hours)

Poisson Processes - Poisson Process and Related distributions - Generalizations of Poisson process - Markov process with discrete state space (Continuous time Markov chains) - Erlang Process.

Text Book:

Stochastic Processes - J. Medhi, Wiley Eastern Limited, Third reprint, 1987

Unit	Chapter/section
I	Chapter 1 : 1.1 to 1.6
II	Chapter 1 : 1.7 & Chapter 2 full
III	Chapter 3 : 3.1 to 3.4
IV	Chapter 3 : 3.5 to 3.8
V	Chapter 4 : 4.1, 4.2, 4.3, 4.5, 4.6

Reference Books:

- 1) Introduction to Stochastic Processes – A. K. Basu, Narosa Publishing House, 2007
- 2) Applied Stochastic Processes – Suddhendu Biswas
New Central Book Agency Pvt. Ltd., Second Edition, 2004
- 3) Basic Stochastic Processes – Zdzislaw Brzezniak and Tomasz Zastawniak
Springer International Edition, First Indian Reprint, 2005

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Course : B.Sc. Code No. :
 Semester : I/III/IV No. of hours allotted : 4
 Paper : Core Elective No. of credit : 3
 Title of the Paper : **Numerical Methods**

Course objective: To develop the skills in solving algebraic, transcendental, differential and integral equations numerically.

Unit -I (12 Hours)
 The solution of Numerical algebraic and transcendental equations : The bisection method – iteration method –Newton -Raphson Method – Regula falsi method.

Unit – II (12 Hours)
 Simultaneous linear algebraic equations: Gauss elimination method –Gauss Jordan method-Method of triangularisation – Iterative methods.

Unit – III (12 Hours)
 Interpolation : Gregory Newton forward interpolation, backward interpolation –Newton’s divided difference interpolation –Lagrange’s interpolation-Inverse interpolation

Unit – IV (12 Hours)
 Numerical differentiation and integration: Newton’s forward, backward formula for derivatives-Trapezoidal rule- Simpson’s 1/3 rule

Unit-V (12 Hours)
 Numerical solution of ordinary differential equation: Taylor series method-Euler’s method- Runge kutta method of fourth order only, Milne’s predictor and corrector method

Text Book:
 Numerical methods in Science and Engineering - Dr. M.K. Venkataraman,
 The National publishing company, 2009

Unit	Chapter/section
I	Chapter III: Sections-2, 3, 4, 5
II	Chapter IV: Sections-2, 3, 4 and 6
III	Chapter VI: Sections - 3, 4 Chapter VIII: Sections – 3, 4, 5
IV	Chapter IX: Sections - 2, 3, 8,10
V	Chapter XI: Sections - 6,10,13,20

Reference Books :

- 1) Numerical methods - S. Arumugam, A. Thangapandi Issac and A. Somasundaram
 SciTech Publication Pvt. Ltd., 2003.
- 2) Numerical Methods – E. Balagurusamy
 Tata McGraw Hill Publishing Company Ltd., 9th Reprint 2002
- 3) Numerical Analysis – Manicavachagom pillay and Narayanan
 S. Viswanathan Publishers Pvt. Ltd., 1994

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Course : B.Sc. Code No. :
Semester : I/III/IV No. of hours allotted : 4
Paper : Core Elective No. of credits : 3
Title of the Paper : **Fuzzy sets**

Course objective: To introduce the concept of uncertainty and fuzziness in logic and to Study fuzzy arithmetic, fuzzy relations and construction of fuzzy sets.

Unit - I (12 Hours)

Fuzzy Set: Introduction- Visual basic types – basic concepts – Fuzzy sets verses crisp sets: - Additional properties of – Cuts – Representation of Fuzzy sets – Extension Principle for fuzzy sets.

Unit - II (12 Hours)

Operation on Fuzzy Sets:- Types of Operations – Fuzzy Complements – Fuzzy intersections – fuzzy Unions – Combination of operations

Unit –III (12 Hours)

Fuzzy arithmetic – Fuzzy numbers – linguistic variables – arithmetic operations on intervals – arithmetic operations on Fuzzy numbers – lattice of Fuzzy numbers – Fuzzy equations

Unit - IV (12 Hours)

Fuzzy relations – binary Fuzzy relations – binary relation on a single set –Fuzzy equivalence relation - Fuzzy ordering relation

Unit - V (12 Hours)

Constructing Fuzzy sets – method of construction – direct method with one expert - direct method with multiple expert – indirect method with one expert – constructions from sample data – Lagrange interpolation – least square cure fitting

Text Book:

Fuzzy Sets and Fuzzy Logic Theory and Applications - George J. Klir and Bo Yuan
Prentice-Hall of India, 2005

Unit	Chapter/section
I	1(1.1 – 1.3), 2(2.1 – 2.3)
II	3(3.1 – 3.6)
III	4(4.1 – 4.6)
IV	5(5.3 – 5.5, 5.7)
V	10(10.2 – 10.7)

Reference Books:

- 1) Fuzzy Set Theory and its Applications - H.J. Zimmermann
Allied Publishers Ltd., Second Edition, 1996
- 2) A First Course in Fuzzy Logic – Hung T. Nguyen and Elbert A. Walker
Chapman and Hall/CRC, 3rd Edition, 2006

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Course : B.Sc. Code No. :
Semester : I/III/IV No. of hours allotted : 4
Paper : Core Elective No. of credits : 3
Title of the Paper : **Computer Algorithms**

Course Objective : To study the various design techniques and general methods for solving problems using computer programming
To apply them as algorithms to solve specific problems and analyze and compare these algorithms.

Unit – I (12 Hours)
Introduction: What is an Algorithm – Algorithm Specifications – Performance Analysis.

Unit – II (12 Hours)
Divide and Conquer method: General method – Binary Search – Finding the maximum and minimum – Merge sort – Quick sort – Performance Measurement.

Unit – III (12 Hours)
Greedy Method : General method – Job sequencing with deadlines – Minimum cost spanning tree – Prim’s algorithm – Kruskal’s algorithm – Single Source shortest paths.

Unit – IV (12 Hours)
Dynamic programming: General method – multistage graphs – all pairs shortest paths – single source shortest paths – general weights – The traveling salesman problem.

Unit – V (12 Hours)
Basic traversal and search Techniques: Techniques for Binary Trees – Techniques for graphs – Breadth first Search and Traversal – Depth first search and traversal – Connected components and spanning trees.

Text Book:

Fundamentals of Computer Algorithms
- Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran
- Galgotia Publications private Limited, 2010

Unit	Chapter/section
I	Chapter-1 1.1 to 1.3
II	Chapter-3 3.1 to 3.4, 3.5.1
III	Chapter-4 4.1, 4.4, 4.5.1, 4.5.2, 4.8
IV	Chapter-5 5.1 to 5.4, 5.9
V	Chapter-6 6.1 to 6.3

Reference Books:

- 1) Theory and Problems of Data Structures – Seymour Lipschutz, Schaum’s Series, Tata McGraw Hill, 1986.
- 2) Computer Algorithms – Sara Baase and Allen Van Gelder
Pearson Education, 3rd Edition, 2009
- 3) Fundamentals of Algorithms – Gilles Brassard and Paul Bratley
Prentice Hall of India Pvt. Ltd., 2003

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Course : B.Sc. Code No. :
Semester : I/III/IV No. of hours allotted : 4
Paper : Core Elective No. of credits : 3
Title of the Paper : **Data Mining**

Course objective: Understanding knowledge base database, Discovering and Mining common pattern from data sets.

Unit – I (12 Hours)

DATA MINING: Introduction – Data Mining – Success Stories – Main Reason for Growth of Data Mining Research – Recent Research Achievements – Graphical Models and Hierarchical Probabilistic Representations – New Applications – Trends that Effect Data Mining – Research Challenges – Test beds and Infrastructure.

DATA MINING FROM A BUSINESS PERSPECTIVE: Introduction – From Data Mining Tools to Solutions – Evolution of Data Mining Systems – Knowledge Discovery Process – Data Mining Supporting Technologies Overview – Data Mining Techniques

Unit - II (12 Hours)

DATA TYPES, INPUT AND OUTPUT OF DATA MINING ALGORITHMS: Introduction – Instances and Features – Different Types of Features(Data) – Concept Learning and Concept Description – Output of Data Mining – Knowledge Representation. DECISION TREES – CLASSIFICATION AND REGRESSION TREES: Introduction-Constructing Classification Trees – CHAID (Chi-square Automatic Interaction Detection) –CART (Classification and Regression Trees) – Regression Trees – General Problems in Prediction of Classes for Data with Unknown Class Value – Pruning – Introduction – Model Estimation

Unit - III (12 Hours)

PREPROCESSING AND POSTPROCESSING IN DATA MINING: Introduction –Steps in Preprocessing – Discretization – Feature Extraction, Selection and Construction – Missing Data and Methodological Techniques for Dealing it – Example of Dealing Missing Data in Decision Tree Induction – Post processing. ASSOCIATION RULE MINING: Introduction – Automatic Discovery of Association Rules in Transaction Databases – The Apriori Algorithm – Shortcomings.

Unit - IV (12 Hours)

ALGORITHMS FOR CLASSIFICATION AND REGRESSION : Introduction – Naïve Bayes- Multiple Regression Analysis –Logistic Regression – k-Nearest Neighbour Classification – GMDH (Group Method of Data Handling) – Evolutionary Computing and Genetic Algorithms

Unit – V (12 Hours)

CLUSTER ANALYSIS: Introduction – Partitional Clusterings – k-medoids – Modern Clustering Methods – Birch – DBSCAN

Text Book: Insight into Data Mining Theory and Practice
- K.P. Soman, Shyam Diwakar and V. Ajay, Prentice Hall of India Pvt. Ltd., 2006

Unit	Chapter/section
I	Chapters 1 and 2
II	Chapters 3 and 4
III	Chapters 5 and 7
IV	Chapter 9
V	Chapter 11-Sections 11.1 – 11.6

Reference Books :

- 1) Data Mining Concepts and Techniques - Jiawei Han and Micheline Kamber, Morgan Kaufmann Publishers, An Imprint of Elsevier, 2nd Edition, 2006.
- 2) Data Mining, Practical Machine Learning Tools and Techniques
- Ian H. Witten and Eibe Frank, Morgan Kaufmann Publishers, 2008

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DEPARTMENT OF MATHEMATICS
(From 2014-17batch onwards)

Course : B.Sc. Code No. :
 Semester : I/III/IV No. of hours allotted : 4
 Paper : Core Elective No. of credits : 3
 Title of the Paper : **Mathematical Modelling**

Course objective: To Acquire knowledge about the applications of Mathematical ideas in various fields.

Unit – I (12 Hours)

Mathematical Modelling through Ordinary Differential Equations and systems of ordinary differential equations of first order : Linear and growth decay models- Non linear growth models-Modelling in Economics –Models in Medicine, Arms, Race Battle and International Trade in terms of systems of ODEs.

Unit – II (12 Hours)

Mathematical Modelling through Difference equations: Modelling Economics and Finance –In Population Dynamics and Genetics-In Probability theory.

Unit – III (12 Hours)

Mathematical Modelling through Partial Differential Equations: Situations giving rise to partial differential equation models-Mass-Balance equations: First method of getting PDE models –Momentum- Balance equations: Second method of getting PDE models

Unit – IV (12 Hours)

Mathematical modelling through functional equations, mathematical modelling through integral equations, Mathematical modelling through delay-differential and differential-difference equations, Optimization principles and techniques, Mathematical modelling through calculus of variations.

Unit – V (12 Hours)

Mathematical Modelling through Mathematical programming, maximum principle and maximum entropy principle : Mathematical Modelling through Linear Programming- Modelling through maximum principle - modeling through the use of principle of maximum entropy-

Text Book:

Mathematical Modelling – J.N. Kapur, New Age International (P) Ltd., Publishers, 2009

Unit	Chapter/section
I	2.2, 2.3, 3.4, 3.5
II	5.3, 5.4, 5.5
III	6.1, 6.2, 6.3
IV	8.1 to 8.3, 9.1 to 9.2
V	10.1, 10.3, 10.4

Reference Books:

- 1) Modelling with differential and difference Equations
 – Glenn Fulford, Peter Forrester & Arthur Jones, Cambridge University Press, 2001.
- 2) Mathematical Modelling: Principles and Applications
 – Frank R. Giordno, William P. Fox, Steven B. Horton and Maurice D. Weir
 Cengage Learning, 2009

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DEPARTMENT OF MATHEMATICS
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Course : B. Sc., Mathematics Code No. :
Semester : I/III/IV No. of Hours Alloted : 4
Paper : Core Elective No. of Credits : 3

Title of the Paper: **Fractal Geometry**

Course Objective: To introduce the idea of Fractals and to study its Topological Structure.

Unit – 1 (12 Hours)
Spaces- Metric Spaces- Cauchy Sequences- Limit Points- Closed Sets-Perfect Sets-Complete Metric Spaces- Compact Sets-Bounded Sets- Open Sets-Interiors-Boundaries.

Unit- II (12 Hours)
Connected Sets-Disconnected Sets-Pathwise-Connected Sets-The Metric Space $(\mathcal{H}(X), h)$ - The Completeness of the Space of Fractals.

Unit- III (12 Hours)
Transformations on the Real Line- The Contraction Mapping Theorem- Contraction Mappings on the Space of Fractals.

Unit – IV (12 Hours)
The Addresses of Points on Fractals - Continuous Transformations from Code Space to Fractals- Introduction to Dynamical Systems

Unit V (12 Hours)
Fractal Dimension-The Theoretical Determination of the Fractal Dimension- The Experimental Determination of the Fractal Dimension

Text Book:

Fractals Everywhere – Michael F. Bransley, 2nd Edition, Academic Press, 1993.

Units	Chapters/ Sections
I	Chapter II(1, 2, 3, 4)
II	Chapter II (5, 6, 7)
III	Chapter III (1, 6, 7)
IV	Chapter IV (1, 2, 3)
V	Chapter V(1, 2, 3)

Reference Books:

- 1) Creating Fractals- Roger Stevens, Charles River Media, Inc., 2005.
- 2) Chaos, Fractals and Dynamics – P. Fischer and William R. Smith, Marcel Dekker Inc., 1985
- 3) Chaos: An Introduction to Dynamical Systems – Kathleen T. Alligood, Tim. D. Sauer and James A. Yorke, Springer Verlag, 1996.

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Course	: B.Sc Mathematics	Code :
Semester	: II/IV/VI	No. of hours allotted : 2
Paper	: Skill Based Elective	No. of Credits : 2
Title of the Paper	: C-Programming-Practical	

List of Practicals

1. Fahrenheit to Celsius
2. Simple interest and Compound interest
3. Largest of three numbers
4. Odd/Even Number
5. Reverse the Number
6. Sum of Digits
7. Number of Multiples of 7 between 1 and 100
8. Prime Number
9. Quadratic Equation using switch case
10. Fibonacci Series
11. Average of n values
12. nCr value
13. Multiplication table
14. Standard deviation
15. Median
16. Ascending order
17. Descending order
18. Sorting a list of Names
19. Matrix addition and subtraction
20. Matrix multiplication

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Course	: B.Sc.	Code No.	:
Semester	: II/IV/VI	No. of hours allotted	: 2
Paper	: Skill Based Elective	No. of credits	: 2
Title of the Paper	: Numerical Methods – Practical		

List of Practicals

1. Finding a root of the given equation using bisection method
2. Finding a root of a given equation using Newton Raphson method
3. Solving the given system of equation by Gauss elimination method
4. Finding $f(x)$ at given x using Newton's interpolation formula
5. Finding $f(x)$ at given x using Lagrange's interpolation formula
6. Evaluating dy/dx , at a given x using Newton's differentiation formula
7. Evaluating $\int f(x) dx$ using Trapezoidal rule
8. Evaluating $\int f(x) dx$ using Simpson's 1/3 rule
9. Solving the given differential equation by Euler's method
10. Solving the given differential equation by Runge-Kutta method (4th Order only)

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Course	: B.Sc.	Code No.	:
Semester	: II/IV/VI	No. of hours allotted	: 2
Paper	: Skill Based Elective	No. of credits	: 2
Title of the Paper	: Graph Theory – Practical		

List of Practicals

1. Degree of a vertex
2. Connectedness
3. Depth First search
4. Breath First search
5. Kruskal’s Algorithm
6. Prim’s Algorithm
7. Single Source shortest Path
8. Vertex Coloring

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Course	: B.Sc.	Code :
Semester	: II/IV/VI	No. of Hrs allotted: 2
Paper	: Skill Based Elective	No. of Credits : 2
Title of the Paper	: Web Designing with HTML	

List of Practicals

1. Creating a HTML document using basic tags.
2. Creating a personal profile web page with a suitable background design , background color and a text color.
3. Creating a HTML document with menu using ordered and unordered list.
4. Creating tables in HTML with various options.
5. Designing a web page using Frames.
6. Developing a complete web page using Frames and Framesets which gives the information about an organization or an institution.

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Course : B.Sc. Code No. :
Semester : II/IV/VI No. of hours allotted : 2
Paper : Skill Based Elective No. of credits : 2
Title of the Paper : **Theory of Numbers**

Course objective : To introduce the number system with important proof techniques

Unit - I (15 Hours)

The Natural Numbers – Peano’s postulates – Mathematical Induction – The Index laws.

Unit – II (15 Hours)

The Fundamental Theorem of Arithmetic – The Sieve of Erasthones – Congruences – Theorems of Euler, Fermat and Lagrange.

Text Book:

Modern Algebra, Vol. I

- K.S. Narayanan and T.K. Manicavachagom Pillay,
S. Viswanathan (Printers and Publishers) Pvt. Ltd., 1982.

Unit	Chapter/section
I	3.1
II	3.9, 3.10, 3.12

Reference Books:

- 1) Number Theory - George E. Andrews
Hindusthan Publishing Corporation (India), 1992
- 2) Introduction to Analytic Number Theory
– Martin Erickson and Anthony Vazzana,
Chapman and Hall /CRC publications,2009.

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Course : B.Sc. Code No. :
Semester : II/IV/VI No. of hours allotted : 2
Paper : Skill Based Elective No. of credits : 2
Title of the Paper : **Statistical Test of Significance**

Course objective: To introduce the statistical tools and ANOVA concepts

Unit I (15 Hours)

Chi-square distribution –Students’s ‘t’ distribution - Snedecor’s ‘F’ distributions

Unit II (15 Hours)

Analysis of variance: One way, Two way classifications, Latin square design

Text books: 1) Fundamentals of Mathematical Statistics
- S.C. Gupta and V.K. Kapoor, Edition:
Sultan Chand and sons, 9th revised edition, 1999,
2) Statistics
- S. Arumugum and A. Thangapandi Issac,
New Gamma publishing house, 1996

Unit	Book	Chapter/section
I	1	13(13.1 to 13.7.3) 14(14.1 to 14.2.10, 14.5 to 14.5.7)
II	2	17(17.0 to 17.3)

Reference Books:

- 1) Statistical methods – S.P. Gupta, Sulthan Chand and Sons, 1998
- 2) Elements of Mathematical Statistics – S.C. Gupta and V.K. Kapoor,
Sulthan Chand and Sons, 3rd Edition, 2001

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Course : B.Sc. Code No. :
Semester : II/IV/VI No. of hours allotted : 2
Paper : Skill Based Elective No. of credits : 2
Title of the Paper : **Z and Fourier Transforms**

Course objective: To introduce the concept of Z transforms, Fourier transforms and some of its applications

Unit - I **(15 Hours)**

Z-Transform : Introduction- Definition of the Z- transforms- Properties of Z-transforms- Z-transforms of some basic functions. Inverse Z-transforms – Use of Z-transforms to solve finite difference equations.

Unit – II **(15 Hours)**

Fourier Transform : Introduction - Fourier Integral theorem – Fourier Transforms – Alternate form of Fourier Complex Integral formula-Properties of Fourier transforms-Finite Fourier transforms.

Text Book:

Engineering Mathematics – Third Edition (For Semester III)
- T. Veerarajan, Tata Mc Graw – Hill, 2005

Unit	Chapter/section
I	7.1 to 7.5
II	6.1 to 6.4, 6.6, 6.7

Reference books:

- 1) Higher Engineering Mathematics – B.S. Grewal,
Khanna Publishers, 34th Edition, 1998
- 2) Advanced Engineering Mathematics – R.K. Jain and S.R.K. Iyengar
Narosa Publishing House, 2002

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Course : B.Sc. Code No. :
Semester : II/IV/VI No. of hours allotted : 2
Paper : Skill Based Elective No. of credits : 2
Title of the Paper : **Theory of Lattices**

Course objective: To introduce the concept of Lattice, various types of lattices and Boolean algebra

Unit - I **(15 Hours)**

Lattices – Some Properties of Lattices – New Lattices – Modular and Distributive Lattices

Unit - II **(15 Hours)**

Boolean Algebras – Boolean Polynomials – Karnaugh Map

Text Book:

Discrete Mathematics

- Dr. M.K. Venkataraman, Dr. N. Sridharan and Dr. N. Chandrasekaran,
The National Publishing Company, Reprinted May 2009

Unit	Chapter/section
I	X(1 – 4)
II	X(5 – 7)

Reference Books:

- 1) Discrete Mathematical Structures with Applications to Compute Science
- J.P. Trembley and R. Manohar,
Tata McGraw –Hill Publishing Company Ltd, 14th reprint 2001.
- 2) Discrete Mathematics – Seymour Lipschutz and Marc Lars Lipson
Tata McGraw Hill Publishing Company Ltd., 2002

Allied Papers

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DEPARTMENT OF MATHEMATICS
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Course : B.Com. Code No. : MK13
 Semester : I No. of hours allotted : 4
 Paper : Major No. of credits : 4
 Title of the Paper : **Business Mathematics**

Course objective :

UNIT - I Simple and Compound Interest **(12 Hours)**
 Calculating simple interest – Finding out missing items – Calculating Compound Interest
 – Finding out missing items – Difference between simple Interest and Compound Interest.

UNIT – II Commercial Arithmetic **(12 Hours)**
 Discount on Bills - Logarithms – Laws of logarithms – Characteristics and Mantissa –
 Antilogarithms – Ratio – Proportions and Percentages - Annuities- Simple problems.

Unit – III Sets **(12 Hours)**
 Basic Concepts – Set Operation – Union of Set – Intersection of sets – Difference of sets
 – Venn diagram – Laws of sets.

Unit – IV Matrices **(12 Hours)**
 Basic Concepts – Addition and Subtraction of Matrices – Multiplication of two matrices
 – Inverse of a Matrix – Solving equation through consistency of equation – Rank of a Matrix.

Unit – V : Differential Calculus (excluding Trigonometric Functions) **(12 Hours)**
 Rules – Sum-rule product rule – Quotient rule, function of a function rule (Simple
 Problem only) – Maximum and Minimum (Single variable cases) – Methods of integral calculus
 – rules (excluding integration by parts and fractions) – Simple problems only.

Text Books:

- 1) Business Mathematics, P.R. Vittal, Margham Publications, III Edition 2005
- 2) Business Mathematics, N.K. Nag, Revised Edition 2012 (For Unit V)
- 3) An Introduction to Business Mathematics, V. Sundaresan and S. D. Jayaseelan, reprint 2002.

Unit	Book	Chapter/Section
I	1	17, 18
II	1	19, 6, 2, 11
III	1	1(pages 1 – 36)
IV	1 3	14 8 (8.8, 8.9)
V	2	7, 8, 9, 10

Reference Books:

- 1) Business Maths - Kashyap Trivedi and Chirag Trivedi, Pearson Education, 2011
- 2) Business Maths & Statistics – J. K. Das & N. G. Das, First Edition.

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DEPARTMENT OF MATHEMATICS
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Course : B.Sc. Chemistry Code No. : AC31 (M)
 Semester : III No. of hours allotted : 6
 Paper : Allied No. of credits : 4
 Title of the Paper : **Allied Mathematics - I**

Course objective: To introduce the basic concepts of series, differentiation, integration, statistical ideas and group theory

Unit - I (18 Hours)

Evaluation of series : Binomial series - Exponential series - Logarithmic series.

Unit - II (18 Hours)

Theory of equations : Reciprocal equations - Transformation of Equations - Newton's and Horner's method of finding roots up to 2 decimal places.

Unit - III (18 Hours)

Differentiation : Curvature – Radius of curvature – Circle of curvature – Evolutes

Unit – IV (18 Hours)

Integration : Integration by parts – Reduction formula – Evaluation of Double and Triple integral

Unit - V (18 Hours)

Group theory : Group - Elementary properties of a group - Subgroups - Cyclic groups – The order of an element - Cosets and Lagrange's theorem.

- Text Books :** 1) Ancillary Mathematics – I - S. Arumugm and Issac,
 New Gamma Publishing House, 1996
 2) Ancillary Mathematics – II - S. Arumugm and Issac,
 New Gamma Publishing House, December 1996
 3) Ancillary Mathematics – IV - S. Arumugm and Issac,
 New Gamma Publishing House, 1997

Unit	Book	Chapter/Section
I	1	5, 6, 7
II	1	8
III	1	2
IV	2	1.3, 1.4, 1.5
V	3	2.1, 2.2, 2.5, 2.6, 2.7, 2.8

Reference Books:

- 1) Ancillary Mathematics Book I
 - T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy,
 S.V. Publications Pvt. Ltd., 1998
- 2) Ancillary Mathematics Volume I Part II
 - T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy,
 S.V. Publications Pvt. Ltd., 1989
- 3) Ancillary Mathematics Book IV
 - T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy,
 S.V. Publications Pvt. Ltd., 1996

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DEPARTMENT OF MATHEMATICS
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Course : B.Sc. Chemistry Code No. : AC41 (M)
 Semester : IV No. of hours allotted : 6
 Paper : Allied No. of credits : 4
 Title of the Paper : **Allied Mathematics - II**

Course objective: To develop the mathematical skills to study higher Chemistry

Unit - I (18 Hours)

Ordinary differential equations : Second order homogeneous linear differential equations with constant coefficients - Second order homogeneous linear differential equations with variable coefficients.

Unit - II (18 Hours)

Partial differential equations : Formation of partial differential equations - Solution of partial differential equations - Standard form $Pp + Qq = Rr$

Unit - III (18 Hours)

Laplace transform : Laplace transform - Inverse Laplace transform - Solution of differential equations using Laplace transform.

Unit - IV (18 Hours)

Statistics : Correlation – Rank correlation - Interpolation.

Unit - V (18 Hours)

Applications of differential equations : Orthogonal trajectories - Growth and decay – Continuous compound interest.

Text Book : Ancillary Mathematics – III - S. Arumugm and Issac,
 New Gamma Publishing House, 1997

Unit	Chapter/Section
I	2.1, 2.2, 2.3, 2.4
II	4
III	3
IV	6.1, 6.2, 7
V	5.1, 5.2, 5.3

Reference Books:

- 1) Differential Equations and Applications – Arumugam & Isaac,
 New Gamma Publishing House – 2008.
- 2) Ancillary Mathematics Volume I Part II
 - T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy,,
 S.V. Publications Pvt. Ltd., 1989
- 3) Statistics - S. Arumugam and A. Thangapandi Isaac
 New Gamma Publishing House, 2011

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Course : B.Sc. Physics Code No. : AP51 (M)
 Semester : V No. of hours allotted : 6
 Paper : Allied No. of credits : 5
 Title of the Paper : **Allied Mathematics - I**

Course objective: To introduce the basic concepts of series, differentiation, integration, statistical ideas and transformation in complex plane.

Unit - I (18 Hours)

Evaluation of series: Binomial series - Exponential series - Logarithmic series.

Unit - II (18 Hours)

Theory of Equations: Reciprocal equations - Transformation of Equations - Newton's and Horner's method of finding roots upto 2 decimal places.

Unit - III (18 Hours)

Differentiation: Curvature – Radius of curvature – Circle of curvature - Evolutes

Unit – IV

Integration: Integration by parts – Reduction formula – Evaluation of Double and Triple integral

Unit - V (18 Hours)

Bilinear transformations: Elementary transformations- Cross ratio – Fixed points

- Text Books :**
- 1) Ancillary Mathematics – I - S. Arumugm and Issac, New Gamma Publishing House, 1996
 - 2) Ancillary Mathematics – II - S. Arumugm and Issac, New Gamma Publishing House, 1996
 - 3) Ancillary Mathematics – III - S. Arumugm and Issac, New Gamma Publishing House, 1997

Unit	Book	Chapter/Section
I	1	5, 6, 7
II	1	8
III	1	2
IV	2	1.3, 1.4, 1.5
V	3	9

Reference Books:

- 1) Ancillary Mathematics Book I
 - T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy,, S.V. Publications Pvt. Ltd., 1998
- 2) Ancillary Mathematics Volume I Part II
 - T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy,, S.V. Publications Pvt. Ltd., 1989
- 3) Ancillary Mathematics Book IV
 - T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy,, S.V. Publications Pvt. Ltd., 1996
- 4) Complex Analysis - S. Arumugam and others
 SciTech publications Chennai, 2002

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DEPARTMENT OF MATHEMATICS
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Course : B.Sc. Physics Code No. : AP61 (M)
 Semester : VI No. of hours allotted : 6
 Paper : Allied No. of credits : 5
 Title of the Paper : **Allied Mathematics - II**

Course objective: To develop the mathematical skills to study higher Physics

Unit - I (18 Hours)

Ordinary differential equations: Second order homogeneous linear differential equations with constant coefficients - Second order homogeneous linear differential equations with variable coefficients.

Unit - II (18 Hours)

Partial differential equations: Formation of partial differential equations - Solution of partial differential equations - Standard form $Pp + Qq = Rr$.

Unit - III (18 Hours)

Laplace transform: Laplace transform - Inverse Laplace transform - Solution of differential equations using Laplace transform.

Unit - IV (18 Hours)

Statistics: Correlation – Rank correlation - Interpolation.

Unit - V (18 Hours)

Application of integration: Centre of mass - Moment of inertia.

- Text Books:**
- 1) Ancillary Mathematics – III - S. Arumugm and Issac, New Gamma Publishing House, 1997
 - 2) Ancillary Mathematics – IV - S. Arumugm and Issac, New Gamma Publishing House, 1997

Unit	Book	Chapter/Section
I	1	2
II	1	4
III	1	3
IV	1	6.1, 6.2, 7
V	2	5.1, 5.2

Reference Books:

- 1) Differential Equations and Applications – Arumugam & Isaac, New Gamma Publishing House – 2008.
- 2) Ancillary Mathematics Volume I Part II
 - T.K. Manicavachagom Pillay, T. Natarajan and K.S. Ganapathy,, S.V. Publications Pvt. Ltd., 1989
- 3) Statistics - S. Arumugam and A. Thangapandi Isaac
 New Gamma Publishing House, 2011

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Course : B.Sc. Computer Science Code No. : AS11
Semester : I No. of hours allotted : 5
Paper : Allied No. of credits : 4
Title of the Paper : **Discrete Mathematics**

Course Objective: To introduce the concepts of Relations, Functions and logic.
To introduce the concepts of Matrices, Graph Theory, lattices and types of lattices.

Unit – I (15 Hours)

Relations and Functions : Cartesian Product of Two sets – Relations – Representations of a Relation – Operations on Relations – Equivalence Relations – Closures and Warshall’s Algorithm – Partitions and Equivalence Classes

Functions and operators – One – to – one , Onto functions – Special Types of Functions – Invertible Functions – Composition of Functions (Proofs of the Theorems are not included – Problems only)

Unit – II (15 Hours)

Matrix Algebra : Introduction - Matrix operations – Inverse of a Square Matrix – Elementary operations and Rank of a Matrix – Simultaneous Linear Equations – Inverse by Partitioning - Eigen values and Eigen vectors (Proofs of the Theorems are not included – Problems only)

Unit – III (15 Hours)

Logic : Introduction – TF-statements – Connectives – Atomic and compound statements – Well Formed (Statement) Formulae – Truth table of a Formula – Tautology – Tautological Implications and Equivalence of Formulae – Replacement Process – Functionally complete sets of connectives and Duality law – Normal Forms – Principal Normal Forms.

Unit – IV (15 Hours)

Lattices and Boolean Algebra : Lattices – Some properties of Lattices – New Lattices – Modular and Distributive Lattices (Proofs of the Theorems are not included – Simple problems only)

Unit – V (15 Hours)

Graph Theory : Basic concepts – Matrix Representation of Graphs
(Proofs of the Theorems are not included)

Text Book: Discrete Mathematics

- Dr. M.K. Venkataraman, Dr. N. Sridharan and Dr. N. Chandrasekaran,
The National Publishing Company, Reprinted May 2009

Unit	Chapter/Section
I	II(1 – 7) III(1 – 5)
II	VI(1 – 7)
III	IX(1 – 12)
IV	X(1- 4)
V	XI(1 and 2)

Reference Books: 1) Discrete Mathematical Structures with Applications to Compute Science
- J.P. Trembley and R. Manohar ,
Tata McGraw –Hill Publishing Company Ltd, New Delhi, 14th reprint 2001.
2) Discrete Mathematics – Seymour Lipschutz and Marc Lars Lipson
Tata McGraw Hill Publishing Company Ltd., 2002

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DEPARTMENT OF MATHEMATICS
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Course : B.Sc. Computer Science Code No. : AS21
Semester : II No. of hours allotted : 5
Paper : Allied No. of credits : 4
Title of the Paper : **Statistics**

Course Objective : (i) To acquire various skills about basic statistical concepts.
(ii) Fitting statistical data in various distributions.

Unit – I (15 Hours)

Central Tendencies: Introduction – Arithmetic Mean.
Measures of Dispersion: Introduction – Measures of Dispersion.

Unit - II (15 Hours)

Correlation and Regression: Introduction – Correlation – Rank Correlation – Regression.

Unit - III (15 Hours)

Random Variables: Mathematical Expectations – Mathematical Expectation of Continuous Random Variable – Moment Generating Function – Characteristic Function.

Unit – IV (15 Hours)

Some Special Distributions: Introduction – Binomial Distribution – Poisson Distribution.

Unit - V (15 Hours)

Normal Distribution, Some more continuous distribution (Gamma distribution, Chi-square distribution, Student’s t -distribution, Snedecor’s F- distribution, Fischer’s Z – distribution).

Note: Formula Derivations are not required. Only problems need be dealt with.

Text Book :

Statistics - S. Arumugam and A. Thangapandi Isaac
New Gamma Publishing House, 2011

Unit	Chapter/Section
I	2(2.0 to 2.1), 3(3.0, 3.1)
II	6(6.0 – 6.3)
III	12(12.4 – 12.6)
IV	13(13.0 – 13.2)
V	13(13.3, 13.4)

Reference Books :

- 1) Fundamentals of Mathematical Statistics- S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons, 2007
- 2) Basic Statistics - B. L. Agarwal, Wiley Eastern Limited, 1988
- 3) Schaum’s Outline Series : Theory and Problems of Statistics – Murray R. Spiegel, McGraw Hill, 1981
- 4) Statistics –A First Course, John E. Freund and Benjamin M. Perles, Prentice Hall International Inc., Seventh Edition, 1999

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Course : B.Sc. Computer Science Code No. : AS31
Semester : III No. of hours allotted : 5
Paper : Allied No. of credits : 4
Title of the Paper : **Numerical Methods**

Course objective : Introducing fundamental concepts of Numerical methods such as solving algebraic equations, interpolation, differentiation and integration.

Unit – I (15 Hours)

Solution of algebraic equations : Bisection method –Successive approximation method – False Position method – Newton-Raphson method – Horner’s method (Problems only).

Unit – II (15 Hours)

Solution of simultaneous linear algebraic equations : Introduction - Gauss elimination method – method of triangularisation – Jacobi’s method – Gauss Seidel method – finite differences – difference table - backward differences (problems only).

Unit – III (15 Hours)

Interpolation : Introduction – Linear interpolation –Gregory-Newton forward interpolation – Gregory-Newton backward interpolation – Divided differences – Newton’s interpolation formula for unequal intervals – Lagrange’s interpolation formula – Inverse interpolation (problems only).

Unit – IV (15 Hours)

Numerical differentiation and Integration : Newton’s forward and backward difference formulae to compute the derivatives - Trapezoidal rule – Simpson’s 1/3 rule (problems only).

Unit – V (15 Hours)

Numerical solution of ordinary differential equations : Solution by Taylor series – Euler’s method – Runge -Kutta method (second and fourth orders only) – Milne’s Predictor - Corrector method (problems only).

Text Book: Numerical Methods in Science and Engineering - Dr. M.K. Venkataraman
The National publishing company, Fifth edition (Revised and enlarged) , 1999

Unit	Chapter/Section
I	Chapter III - 1 to 5 and 8 (Horner’s method)
II	Chapter IV - 1 to 4 and 6 Chapter V - 1 to 7
III	Chapter VI - 1 to 5 Chapter VIII - 1, 3, 4 and 5(Inverse interpolation)
IV	Chapter IX - 1, 2, 3, 7, 8 and 10
V	Chapter XI - 6, 10 to 15, 19 and 20

Reference Books:

- 1) Numerical methods - S. Arumugam, A. Thangapandi Issac and A. Somasundaram
SciTech Publication Pvt. Ltd., 2003.
- 2) Numerical Methods – E. Balagurusamy
Tata McGraw Hill Publishing Company Ltd., 9th Reprint 2002
- 3) Numerical Analysis – Manicavachagom pillay and Narayanan
S. Viswanathan Publishers Pvt. Ltd., 1994

THIAGARAJAR COLLEGE, MADURAI – 9.

(Re-Accredited with 'A' Grade by NAAC)

DEPARTMENT OF MATHEMATICS

(From 2014-17batch onwards)

Course	: B.Sc. Computer Science	Code No	: AS41
Semester	: IV	No. of hours allotted	: 5
Paper	: Allied	No. of credits	: 4
Title of the Paper	: Operations Research		

Course objective : To introduce the fundamental concepts of operations research and to train the students in solving managerial and other real time problems.

Unit – I (15 Hours)

Operations Research an overview – Origin and development of OR – Applications of OR – Opportunities and shortcomings of OR - Linear Programming Problem – Mathematical Formulation – Graphical Solution.

Unit – II (15 Hours)

General LPP – Canonical and Standard Forms of LPP – Insights into the simplex Method – Introduction for simplex method - Fundamental properties of solutions (problems only) – The Computational Procedure – Use of Artificial Variables (Problems only).

Unit – III (15 Hours)

Duality in linear programming problem – Introduction – General primal-dual Pair - Formulating a dual Problem – Primal dual pair in matrix form – Duality and simplex method - Dual simplex method (Problems only).

Unit – IV (15 Hours)

Transportation Problem – Introduction – General transportation Problem – The Transportation Table – Loops in transportation table – Triangular basis - Solution of transportation problem – Finding an initial basic feasible Solution – Test for optimality – Economic interpretation - Degeneracy in transportation problem – Transportation algorithm (Modi Method) – Some exceptional cases.

Unit – V (15 Hours)

Assignment problem – Introduction – Mathematical formulation of the Assignment problem – Solution methods of assignment problem – Special cases in Assignment Problems.

Text Book: Operations Research - Kanti Swarup, P.K. Gupta and Man Mohan Sultan Chand & Sons., Reprint Sixteenth Thoroughly Revised Edition 2013

Unit	Chapter/Section
I	Chapter 1 : 1.1, 1.2,1.10 and 1.11 and Chapter 2. Chapter 3 : 3.1 to 3.3.
II	Chapter 3 : 3.4 to 3.6 Chapter 4 : 4.1 to 4.4
III	Chapter 5 : 5.1 to 5.4 , 5.7 ,5.9
IV	Chapter 10:10.1, 10.2, 10.5 to 10.13 and 10.15
V	Chapter 11: 11 .1 to 11.4

Reference Books:

- 1) Operations Research, Theory and Applications - J.K. Sharma, Macmillan Publishers India Ltd. Reprint, 4th Edition, 2010
- 2) Operations Research, P. K. Gupta and D. S. Hira, S. Chand & Company Ltd., Reprint 1990
- 3) Operations Research, G. V. Shenoy, U. K. Srivastava and S. C. Sharma, Wiley Eastern Limited, Reprint 1988.

THIAGARAJAR COLLEGE, MADURAI – 9.
(Re-Accredited with ‘A’ Grade by NAAC)
DEPARTMENT OF MATHEMATICS
(From 2014-17batch onwards)

Course : B.Sc. Mathematics Code No :
Semester : V No. of hours allotted :
Paper : Self – study No. of credits : 5
Title of the Paper : **Quantitative Aptitude**

Course objective: To introduce the basic numeric concepts to the students so that they get confidence to face the competitive examinations

Unit – I

Problems on ages – Percentage – Profit and Loss – Ratio and Proportion – Chain rule

Unit – II

Time and work – Time and distance – Problems on trains - Alligation

Unit – III

Simple interest – Compound interest – Area – Volume and surface area

Unit – IV

Calendar – Clocks – True discount – Banker’s discount

Unit – V

Tabulation – Bar graphs – Pie charts

Text Book: Quantitative Aptitude – R.S. Aggarwal
S. Chand & Company Pvt. Ltd., 2013

Unit	Chapter
I	8, 9, 11, 12, 14
II	15, 17, 18, 20
III	21, 22, 24, 25
IV	27, 28, 32, 33
V	36, 37, 39

Reference Books:

- 1) Quantitative Aptitude for Competitive Examinations – Abhijit Guha
Tata McGraw Hill Education Private Limited, Fourth Edition, Fifth Reprint 2011
- 2) Quantitative Techniques – C.R. Kothari
Vikas Publishing House Pvt. Ltd., Third Edition, First Reprint 1989
- 3) Elements of Quantitative Techniques – T.M. Srinivasan and S. Perumalswamy
MD Gopala Krishnan Emerald Publishers, 1985

M.Sc., Mathematics

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)
M.Sc., MATHEMATICS
COURSE STRUCTURE (w.e.f. 2014 – 2016 batch onwards)
Semester – I

Course	Code No.	Subject	Contact Hours / Week	Credits	Total No of Hours Allotted	Max. Marks		Total
						CA	SE	
Core -1	1PM1	Groups, Rings and Vector spaces	6	5	90	25	75	100
Core -2	1PM2	Real Analysis – I	6	5	90	25	75	100
Core -3	1PM3	Ordinary Differential Equations	6	4	90	25	75	100
Core -4	1PM4	Number Theory	6	4	90	25	75	100
lab	1PML1	Java Practical	6	4	90	40	60	100
Total			30	22	450	140	360	500

Semester – II

Course	Code No.	Subject	Contact Hours / Week	Credits	Total No of Hours Allotted	Max. Marks		Total
						CA	SE	
Core -5	2PM1	Fields and Linear Transformations	6	5	90	25	75	100
Core -6	2PM2	Real Analysis – II	6	5	90	25	75	100
Core -7	2PM3	Topology	6	5	90	25	75	100
Core –8	2PM4	Partial Differential Equations	6	4	90	25	75	100
Core -9	2PM5	Graph Theory	6	4	90	25	75	100
Total			30	23	450	125	375	500

Semester – III

Course	Code No.	Subject	Contact Hours / Week	Credits	Total No of Hours Allotted	Max. Marks		Total
						CA	SE	
Core -10	3PM1	Mechanics	6	4	90	25	75	100
Core -11	3PM2	Complex Analysis	6	5	90	25	75	100
Core -12	3PM3	Optimization Techniques	6	4	90	25	75	100
Elec. - 1	3PME1	Elective - I	6	5	90	25	75	100
Elec -2	3PME2	Elective - II	6	5	90	25	75	100
Total			30	23	450	125	375	500

Semester – IV

Course	Code No.	Subject	Contact Hours / Week	Credits	Total No of Hours Allotted	Max. Marks		Total
						CA	SE	
Core -13	4PM1	Mathematical Statistics	6	4	90	25	75	100
Core -14	4PM2	Functional Analysis	6	5	90	25	75	100
Core - 15	4PM3	Measure and Integration	6	4	90	25	75	100
Elec. - 3	4PME1	Elective - III	6	5	90	25	75	100
PJ	PJ	Project work	6	4	90	40	60	100
Total			30	22	450	140	310	500

Electives I and II to be chosen from the following

- 1) Theory of Computation
- 2) Differential Equations and Dynamical systems
- 3) Combinatorics
- 4) Fluid Dynamics
- 5) Symmetries and Differential Equations

Elective III to be chosen from the following

- 1) Algorithmic Graph Theory
- 2) Numerical Analysis
- 3) Nonlinear Differential Equations
- 4) Differential Geometry

A) Consolidation of Contact Hours and Credits : PG

Semester	Contact Hrs / Week	Credits
I	30	22
II	30	23
III	30	23
IV	30	22
Total	120	90

B) Curriculum Credits

Core	--- 75Credits
Elective	---15 Credits

Total	90 Credits

THIAGARAJAR COLLEGE, MADURAI – 9.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course : M.Sc. Code No. : 1PM1
Semester : I No. of hours allotted : 6
Paper : Core 1 No. of credits : 5
Title of the Paper : **Groups, Rings and Vector spaces**

Course objective : To study the advance ideas in Group theory like fundamental theorem on finite Abelian groups and polynomial Rings in Ring theory.

Unit - I (18 Hours)

Subgroups - A counting principle - Normal subgroups and Quotient groups - Homomorphisms - Automorphisms - Cayley's theorem - Permutation groups.

Unit - II (18 Hours)

Another counting principle - Sylow's theorem - Direct products - Finite Abelian groups.

Unit - III (18 Hours)

Generators of a subgroup – Derived subgroups – Normal series – Solvable groups – Composition series – Zassenhaus lemma - Schrier's Refinement theorem – Jordan-Holder theorem

Unit - IV (18 Hours)

Polynomial Rings - Polynomials over the Rational field - Polynomial Rings over commutative Rings – Noetherian Rings - Artinian Rings.

Unit - V (18 Hours)

Definition and examples of a vector space – Linear independence and bases– Inner product spaces

Text Books:

- 1) Topics in Algebra - I.N. Herstein
Wiely India Pvt. Ltd, Second Edition, Reprint 2012
- 2) Modern Algebra - Quazi Zamirudeen and Surjeet Singh, Reprint 1997

Unit	Book	Chapter/Section
I	1	2.4 – 2.10
II	1	2.11 – 2.14
III	2	5 (Full)
IV	1	3.9 – 3.11
	2	15(Full)
V	1	4.1, 4.2, 4.4

Reference Books:

- 1) Contemporary Abstract Algebra - Joseph A Gallian,
Narosa Publication, 4th edition, 1999
- 2) A course in Abstract Algebra – Vijay K Khanna and S.K. Bhambri
Vikas Publishing House Pvt. Ltd., 3rd Edition, Reprint 2011
- 3) Abstract Algebra – Richard M. Foote and David S. Dummit
John Wiley Publications, 2011

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course : M.Sc. Code No : 1PM2
 Semester : I No. of hours allotted : 6
 Paper : Core 2 No. of credits : 5
 Title of the Paper : **Real Analysis I**

Course objective : To make the students familiar with the concept of the construction of the real number system, the convergence of sequence and series and the analytical rudiments such as continuity and differentiability in the real line.

Unit - I (18 Hours)

The Real and complex number system : Introduction – Ordered sets – Fields – The Real field - The extended real number system – The complex field - Euclidean spaces.

Unit - II (18 Hours)

Basic Topology : Finite, countable and uncountable sets – Metric spaces – compact sets – Perfect sets - connected sets,

Unit - III (18 Hours)

Numerical sequences and series : Convergent sequences – subsequences – Cauchy sequences – Upper and lower limits – Some special sequences - Series – Series of nonnegative terms - The number e – The root and ratio tests - Power series – Summation by parts – Absolute convergence – Addition and Multiplication of series – Rearrangements.

Unit - IV (18 Hours)

Continuity : Limits of functions – Continuous Functions – Continuity and Compactness – Continuity and Connectedness – Discontinuities – Monotonic Functions – Infinite Limits and Limits at Infinity.

Unit - V (18 Hours)

Differentiation : The Derivative of a Real Function – Mean Value Theorems – The Continuity of Derivatives – L’ Hospital’s Rule – Derivatives of Higher Order – Taylor’s Theorem – Differentiation of Vector-valued Functions.

Text Book : Principles of Mathematical Analysis - Walter Rudin,
 McGraw - Hill Education (India) Pvt Ltd, Third Edition - 2013.

Unit	Chapter
I	1 (Full)
II	2 (Full)
III	3 (Full)
IV	4 (Full)
V	5 (Full)

Reference Books :

- 1) Mathematical Analysis – A Modern Approach to Advanced Calculus,
 – Tom M. Apostol, Addison-Wesley Publishing Company, 1974.
- 2) Real Analysis – N.L. Carthers, Cambridge University Press, 2000
- 3) Real Analysis – V. Karunakaran, Pearson Education India, 2012.

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course : M.Sc. Code No : 1PM3
 Semester : I No. of hours allotted : 6
 Paper : Core 3 No. of credits : 4

Title of the Paper : **Ordinary Differential Equations**

Course objective: To provide knowledge of ODE's, power series solution, special function, existence and uniqueness of solutions of ODE's.

Unit - I Linear Differential Equations of Higher order **(18 Hours)**

Equations with variable coefficients – Wronskian – Variation of Parameters – Some standard methods.

Unit - II Solutions in Power Series **(18 Hours)**

Introduction - Second order Linear equation with Ordinary points - Legendre equation and Legendre Polynomials – Second order equation with Regular singular point – Properties of Bessel equations.

Unit - III System of Linear Differential Equations **(18 Hours)**

Introduction – System of First order equations– Existence and Uniqueness theorem – Fundamental Matrix – Non –homogeneous Linear Systems – Linear System with Constant Coefficients.

Unit - IV Existence and Uniqueness of Solutions **18 Hours)**

Introduction – Preliminaries – Successive Approximations – Picard's theorem – Some Examples – Continuation and Dependence on initial conditions.

Unit - V Boundary Value Problems and Oscillations of Second Order Equations **(18 Hours)**

Introduction - Sturm-Liouville problem – Green's function – Fundamental Results – Sturm's Comparison theorem – Elementary Linear Oscillations.

Text Book:

Text Book of Ordinary Differential Equations
 - S. G. Deo, V. Lakshmikantham and V. Raghavendra,
 Tata McGraw Hill Education Private Limited, II Edition, 1997, Sixteenth Reprint 2010.

Unit	Chapter/Section
I	Chapter 2(Section 2.6 to 2.9)
II	Chapter 3(Section 3.1 to 3.5)
III	Chapter 4(Section 4.1 to 4.2, 4.4 to 4.7)
IV	Chapter 5(Section 5.1 to 5.6)
V	Chapter 7(Section 7.1 to 7.3), Chapter 8(Section 8.1 to 8.3)

Reference Books:

- 1) Differential Equations with Applications and Historical Notes - George F. Simmons, Tata McGraw - Hill Publishing Company Ltd., 13th reprint, 2008.
- 2) An Introduction to Ordinary Differential Equations - Earl A. Coddington, PHI Learning Private Limited , 2010.
- 3) Ordinary Differential Equations : A First Course, D. Somasundaram, Narosa Publishing House, 2001.
- 4) Theory of Ordinary Differential Equations, Earl A. Coddington & Norman Levinson, Tata Mc-Graw Hill, 2008.

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course : M.Sc. Code No. : 1PM4
Semester : I No. of hours allotted : 6
Paper : Core 4 No. of credits : 4
Title of the Paper : **Number Theory**

Course objective: To study some importance tools in number theory and study of distributions of primes

Unit – I : Divisibility (18 Hours)
Introduction – Divisibility - Primes

Unit - II : Congruences (18 Hours)
Congruences – Solutions of congruences – The Chinese remainder theorem

Unit - III : Quadratic reciprocity (18 Hours)
Quadratic residues – Quadratic reciprocity – The Jacobian symbol

Unit - IV : Some functions of Number Theory (18 Hours)
Greatest integer function – Arithmetic functions – The Mobius inversion formula.

Unit - V : Diophantine equations (18 Hours)
The equation $ax + by = c$ – Simultaneous linear equations – Pythagorean triangles

Text Book: An introduction to The Theory of Numbers
– Ivan Niven, Herbert S. Zuckerman and Hugh L. Montgomery,
Wiley India Pvt. Ltd., Fifth Edition, Reprint 2013

Unit	Chapter/Section
I	1.1 – 1.3
II	2.1 – 2.3
III	3.1 – 3.3
IV	4.1 – 4.3
V	5.1 – 5.3

Reference books:

- 1) Number Theory – George E. Andrews
Hindustan Publishing Corporation, India, Third reprint 1992
- 2) Elementary Number Theory – David M. Burton
Tata McGraw-Hill Education Pvt. Ltd., Sixth Edition, Reprint 2010
- 3) Introduction to Analytic Number Theory
– Martin Erickson and Anthony Vazzana,
Chapman and Hall /CRC publications, 2009.

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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course	: M.Sc.	Code	: 1PML1
Semester	: I	No. of Hours allotted	: 6
Paper	: Lab	No. of Credits	: 4
Title of the Paper	: Java Practical		

1. Program to find Sin x and Cos x in desired accuracy.
2. Program to Sort the given n numbers and Names.
3. Program to solve the quadratic equation using switch..case statement.
4. Program to add two given matrices.
5. Program to multiply two given matrices.
6. Program to find the transpose of a given matrix.
7. Program to find sum, max, min and average of an array of elements using Inheritance.
8. Program to create a Package to check whether the given number is odd or even, prime and to find its divisors.
9. Program to find the percentage of marks, rank of students of a class using Interfaces.
10. Program in java so that main thread to find the divisors and child thread to check prime.
11. Program in java to handle exceptions.
12. Program to draw a human face.
13. Program to draw bar charts.

THIAGARAJAR COLLEGE, MADURAI – 9.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course : M.Sc. Code No. : 2PM1
Semester : II No. of hours allotted : 6
Paper : Core 5 No. of credits : 5
Title of the Paper : **Fields and Linear Transformations**

Course objective : To introduce the idea connected to Galois theory and its application in solvability by radicals and some concepts in linear transformations

Unit - I (18 Hours)

Dual spaces - The algebra of linear transformations - Characteristic roots

Unit - II (18 Hours)

Matrices - Canonical forms - Triangular forms – Nilpotent transformations

Unit - III (18 Hours)

Hermitian, Unitary and Normal transformations – Real Quadratic forms

Unit – IV (18 Hours)

Extension Fields – Roots of polynomials – Construction with straight edge and compass
– More about roots

Unit – V (18 Hours)

The elements of Galois theory - Solvability by radicals - Finite fields

Text Book:

Topics in Algebra - I.N. Herstein, Wiley India Pvt. Ltd, II Edition, Reprint 2007

Unit	Chapter/Section
I	4.3, 6.1, 6.2
II	6.3, 6.4, 6.5
III	6.10, 6.11
IV	5.1, 5.3 – 5.5
V	5.6, 5.7, 7.1

Reference books :

- 1) Contemporary Abstract Algebra - Joseph A Gallian, Narosa Publication, 4th edition, 1999
- 2) Linear Algebra – Kenneth Hoffman and Ray Kunze
PHI Learning Pvt. Ltd., Second Edition, 2009.
- 3) A course in Abstract Algebra – Vijay K Khanna and S.K. Bhambri
Vikas Publishing House Pvt. Ltd., 3rd Edition, Reprint 2011

THIAGARAJAR COLLEGE, MADURAI – 9.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course	: M.Sc.	Code No	: 2PM2
Semester	: II	No. of hours allotted	: 6
Paper	: Core 6	No. of credits	: 5
Title of the Paper	: Real Analysis II		

Course objective : To make the students familiar with The Riemann-Stieltjes integral, the sequence and series of functions and equicontinuous families of functions. Also to acquire knowledge in exponential, logarithmic, The Trigonometric and The Gamma functions.

Unit - I **(18 Hours)**

The Riemann – Stieltjes Integral : Definition and Existence of the Integral – Properties of the Integral – Integration and Differentiation – Integration of Vector-valued Functions – Rectifiable Curves.

Unit - II **(18 Hours)**

Sequences and Series of Functions : Discussion of Main Problem – Uniform Convergence – Uniform Convergence and Continuity – Uniform Convergence and Integration – Uniform Convergence and Differentiation.

Unit - III **(18 Hours)**

Equicontinuous Families of Functions – The Stone–Weierstrass Theorem.

Unit - IV **(18 Hours)**

Some Special functions : Power series – The Exponential and Logarithmic functions – The trigonometric functions – The Algebraic completeness of the complex field - Fourier Series – The Gamma function.

Unit - V **(18 Hours)**

Functions of Several variables : Linear transformations – Differentiation – The Contraction principle - The Inverse function theorem – The Implicit function theorem.

Text Book : Principles of Mathematical Analysis - Walter Rudin,

McGraw - Hill Education (India) Pvt Ltd, Third Edition - 2013.

Unit	Chapter/Page
I	6 (Full)
II	7 (Pages from 143 to 154)
III	7 (Pages from 155 to 171)
IV	8 (Full)
V	9 (Pages from 204 to 228)

Reference Books :

- 1) Mathematical Analysis – A Modern Approach to Advanced Calculus,
– Tom M. Apostol, Addison-Wesley Publishing Company, 1974.
- 2) Real Analysis – N.L. Carthers, Cambridge University Press, 2000
- 3) Real Analysis – V. Karunakaran, Pearson Education India, 2012.

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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course : M.Sc. Code No : 2PM3
 Semester : II No. of hours allotted : 6
 Paper : Core 7 No. of credits : 5
 Title of the Paper : **Topology**

Course objective: To have a clear understanding on the concept of Topology and to study the various aspects of Topological spaces.

Unit – I (22 Hours)

Topological Spaces – Basis for a topology – The order topology – The product topology on $X \times Y$ – The subspace topology – Closed sets and limit points – Continuous functions – The product topology – The metric topology.

Unit – II (17 Hours)

Connected Spaces – Connected Subspaces of the Real line – Components and local connectedness.

Unit – III (17 Hours)

Compact Spaces – Compact Subspaces of the Real line – Limit point compactness.

Unit – IV (17 Hours)

The Countability axioms – The Separation axioms – Normal spaces – The Urysohn lemma.

Unit – V (17 Hours)

The Urysohn Metrization theorem – The Tietze extension theorem -The Tychonoff theorem.

Text Book:

Topology, James R. Munkres, PHI Learning Private limited, Second Edition, 2013.

Unit	Chapter/Section
I	Chapter 2 : 12-20
II	Chapter 3 : 23-25
III	Chapter 3: 26-28
IV	Chapter 4 : 30-33
V	Chapter 4 : 34,35 Chapter 5 : 37

Reference Books :

- 1) Introduction to Topology and Modern Analysis, George F. Simmons, Tata McGraw-Hill Education Private Limited, Eighteenth Reprint 2012.
- 2) Introduction to Topology, J. V. Deshpande, Tata McGraw-Hill, 1988.
- 3) Topology, K. Chandrasekhara Rao, Narosa Publishing House, Reprint 2012.
- 4) Topology General & Algebraic, D. Chatterjee, New Age International, 2007.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course	: M.Sc.	Code No	: 2PM4
Semester	: II	No. of hours allotted	: 6
Paper	: Core 8	No. of credits	: 4
Title of the Paper	: Partial Differential Equations		

Course objective:

1. To expose the students to various methods of solving different kinds of Partial differential equations.
2. To expose the students how to apply their knowledge in Partial Differential Equations to other branches of sciences.

Unit - I **(18 Hours)**

First Order P.D.E. – Curves and Surfaces – Genesis of First Order P.D.E. – Classification of Integrals – Linear Equations of the First Order – Pfaffian Differential Equations – Compatible Systems – Charpit's Method – Jacobi's Method.

Unit - II **(18 Hours)**

Integral Surfaces Through a Given Curve – Quasi-Linear Equations – Non-linear First Order P.D.E.

Unit - III **(18 Hours)**

Second Order P.D.E.: Genesis of Second Order P.D.E. – Classification of Second Order P.D.E. One-Dimensional Wave Equation – Vibrations of an Infinite string – Vibrations of a Semi- infinite String –Vibrations of a String of Finite Length(Method of Separation of Variables).

Unit - IV **(18 Hours)**

Laplace's Equation: Boundary Value Problems – Maximum and Minimum Principles – The Cauchy Problem – The Dirichlet Problem for the Upper Half Plane – The Neumann Problem for the Upper Half Plane – The Dirichlet Problem for a Circle - The Dirichlet Exterior Problem for a Circle – The Neumann Problem for a Circle – The Dirichlet Problem for a Rectangle – Harnack's Theorem – Laplace's Equation – Green's Function.

Unit - V **(18 Hours)**

Heat Conduction Problem – Heat Conduction –Infinite Rod Case –Finite Rod Case – Duhamel's Principle – Wave Equation – Heat Conduction Equation.

Text Book :

An Elementary Course in Partial Differential Equations , T.Amaranath,
Narosa Publishing House, Second Edition 2003, Eighth Reprint 2013.

Unit	Chapter/section
I	1 (Section 1.1 to 1.8)
II	1(Section 1.9 to 1.11)
III	2(Section 2.1 to 2.3.3, 2.3.5)
IV	2(Section 2.4 to 2.4.11)
V	2(Section 2.5 to 2.6.2)

Reference Books :

- 1) Elements of Partial Differential Equations – I. N. Sneddon, McGraw-Hill, 1957.
- 2) Introduction to Partial Differential Equations : A Computational Approach
- Aslak Tveito & Ragnar Winther, Springer – Verlag, 2010.
- 3) Partial Differential Equations: An Introductory Treatment with Applications,
- K. S. Bhamra, PHI Learning Private Limited, 2010.

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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course : M.Sc. Code No : 2PM5
Semester : II No. of hours allotted : 6
Paper : Core 9 No. of credits : 4
Title of the paper : **Graph Theory**

Course objective: To introduce the graph theoretical concepts that helps to model real life situations.

Unit – I (18 Hours)

Connectivity: Cut-Vertices – Blocks – Connectivity - Menger’s Theorem.

Unit – II (18 Hours)

Matchings and Factorization : Matchings – Factorization – Decompositions and Graceful Labelings

Unit – III (18 Hours)

Planarity: Planar Graphs – Embedding Graphs on Surfaces.

Unit – IV (18 Hours)

Coloring: The Four Color Problem – Vertex Coloring – Edge Coloring.

Unit – V (18 Hours)

Ramsey Numbers: The Ramsey Number of Graphs- Turan’s Theorem.
Distance: The Center of a Graph – Distant Vertices.

Text Book:

Introduction to Graph Theory – Gary Chartrand and Ping Zhang,
Tata McGraw-Hill, 2006

Unit	Chapter/Section
I	5(5.1 – 5.4)
II	8(8.1 – 8.3)
III	9(9.1, 9.2)
IV	10(10.1 – 10.3)
V	11(11.1,11.2) 12(12.1, 12.2)

Reference Books :

- 1) Introduction to Graph Theory – Douglas B. West, Prentice - Hall of India, 2001.
- 2) Graph Theory- Harary, Narosa Publishing House, 1989.
- 3) Graph Theory- Bondy and Murthy, Springer, 2013.

THIAGARAJAR COLLEGE, MADURAI – 9.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course : M.Sc. Code No. : 3PM1
Semester : III No. of hours allotted : 6
Paper : Core 10 No. of credits : 4
Title of the Paper : **Mechanics**

Course Objective: To prepare the students to understand basic concepts of Lagrangian and Hamiltonian approaches to classical mechanics and to study different applications of these concepts in the mechanical and electromagnetic problem.

Unit – I (18 Hours)

Survey of Elementary Principles : Mechanics of a particle - Mechanics of a system of particles – D'Alembert's Principle and Lagrange's equation – Velocity-dependent potential and dissipation function – Simple application of the Lagrangian formulation.

Unit – II (18 Hours)

Variational Principle and Lagrange's Equations : Hamilton's Principle – Some Techniques of the calculus of variation – Derivation of Lagrange's Equation from Hamilton's principle – Extension of Hamilton's principle through nonholonomic systems – Conservation theorems and symmetry Properties.

Unit – III (18 Hours)

Two Body Central Force Problem : Reduction to one body Problem – The equations of motion and first integrals – The equivalent one-dimensional problem – The virial theorem – The differential equation for the orbit, and integrable power-law potentials – Conditions for closed orbits – The Kepler problem: Inverse square law of force – The motion in time in the Kepler problem – The Laplace- Runge- Lenz vector

Unit – IV (18 Hours)

The Hamilton equations of motion : Legendre transformations and the Hamilton equations of motion – Cyclic co-ordinates and conservation theorem – Derivation of Hamilton's equations from a variational principle – The principle of least action.

Unit – V (18 Hours)

Canonical transformations: The equations of canonical transformation – Examples of canonical transformations – Poisson brackets and other canonical invariants.

Text Book:

Classical Mechanics – Herbert Goldstein
Narosa Publishing House, Second Edition, 25th Reprint, 2001.

Unit	Chapter/Section
I	1
II	2(2.1 – 2.4)
III	3(3.1 – 3.9)
IV	8(8.1, 8.2, 8.5, 8.6)
V	9(9.1, 9.2, 9.4)

Reference Books :

- 1) Classical Mechanics – V.B. Bhatia, Narosa Publishing House , 2001.
- 2) Classical Mechanics - C.R. Mondal , PHI Learning Pvt. Ltd., 2004.
- 3) Classical Mechanics – John Robert Taylor, University Science Books, 2005.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course : M.Sc. Code No. : 3PM2

Semester : II No. of hours allotted : 6

Paper : Core 11 No. of credits : 5

Title of the Paper : **Complex Analysis**

Course objective: To understand the concept of analyticity, improper integrals, residues and its applications and elliptic functions.

Unit - I (18 Hours)

Complex Functions: Introduction to the concept of analytic functions – Limits and Continuity – Analytic functions – Polynomials – Rational functions. Elementary theory of Power series – Sequences, Series, Uniform Convergence, Power Series, Abel's Limit theorem – The Exponential and Trigonometric Functions – The Exponential, the Trigonometric Functions – The Periodicity – The Logarithm.

Unit - II (18 Hours)

Complex Integration: Fundamental Theorems – Line Integrals, Rectifiable arcs – Line Integrals as Functions of arcs – Cauchy's theorem for a rectangle – Cauchy's theorem for a disc – Cauchy's Integral formula – Index of a point – Integral Formula – Higher derivatives – Local Properties of Analytic Functions – Removable singularities – Taylor's theorem – Zeros and poles – The Local mapping – The Maximum Principle.

Unit – III (18 Hours)

Complex Integration: Calculus of Residues- Residue theorem, Argument Principle, Evaluation of definite Integrals. Harmonic Functions- Definition and Basic properties, Mean-value Property, Poisson's Formula.

Unit – IV (18 Hours)

Series and Product Development : Power Series Expansions: Weierstrass's Theorem – The Taylor Series – The Laurent Series – Partial Fractions and Factorization: Partial Fractions – Infinite Products – Canonical Products – The Gamma Function – Entire functions : Jensen's Formula – Hadamard's theorem.

Unit – V (18 Hours)

Elliptic functions: Doubly Periodic Functions – The Periodic Module – Unimodular Transformations – The Canonical basis – General Properties of Elliptic Functions – Weierstrass Theory – Weierstrass ρ function – The function $\zeta(z)$ and $\sigma(z)$ – The Differential Equation.

Text Book :

Complex Analysis - V. Ahlfors, McGraw-Hill Education (India), 2013.

Unit	Chapter/Section
I	Chapter 2
II	Chapter 4 : Sections 1, 2 and 3
III	Chapter 4 : 5.1, 5.2, 5.3, 6.1, 6.2, 6.3
IV	Chapter 5 : 1.1, 1.2, 1.3 , 2.1, 2.2, 2.3, 2.4, 3.1,3.2
V	Chapter 7: 2.1, 2.2, 2.3, 2.4, 3.1, 3.2 , 3.3

Reference Books:

- 1) Foundation of Complex Analysis - S. Ponnusamy, Narosa, Ninth Reprint, 2013
- 2) Complex Analysis – J. V. Deshpande, Tata McGraw – Hill, 1989.
- 3) Complex Analysis- V. Karunakaran, Narosa Publishing House, 2000.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course :M.Sc. Mathematics Code : 3PM3

Semester : IV No. of Hours allotted : 6

Paper : Core 12 No. of Credits : 4

Title of the Paper : **Optimization Techniques**

Course Objective : To introduce various decision – making tools and techniques.

Unit - I (18 Hours)

Network Models: Scope and Definition of Network Models – Minimal Spanning Tree Algorithm – Shortest Route Problem

Unit - II (18 Hours)

Network Models: Maximal Flow Model - CPM and PERT

Unit - III (18 Hours)

Deterministic Inventory Models: General Inventory Model – Role of Demand in the Development of Inventory Models – Static Economic order Quantity (EOQ) Models – Dynamic EOQ Models

Probabilistic Inventory Models: Continuous Review Models – Single Period Models – Multiperiod Model

Unit - IV (18 Hours)

Decision Analysis and Games: Decision Making under Certainty – Decision Making under Risk – Decision under Uncertainty – Game Theory

Unit - V (18 Hours)

Queuing Systems: Why Study Queues? – Elements of a Queuing Model – Role of Exponential Distribution – Pure Birth and Death Models - Generalized Poisson Queuing Model – Specialized Poisson Queues – (M/G/1):(GD/∞/∞)- Pollaczek –Khintchine (P-K)Formula – Other Queuing Models – Queuing Decision Models

Text Book:

Operations Research -An Introduction, Hamdy A.Taha,
Pearson Education, 9th Edition, 2012

Unit	Chapter
I	6(6.1 – 6.3)
II	6(6.4 and 6.5)
III	13 & 16
IV	15
V	18

Reference Books :

- 1) Operations Research Theory and Applications – J.K.Sharma,
Macmillan India Ltd, Third Edition, 2009
- 2) Operations Research – Kanti Swarup, P.K.Gupta and Man Mohan ,
Sultan Chand & Sons, Sixteenth Revised Edition, 2013.
- 3) Operations Research – S. D. Sharma , Kedernath Ramnath, 2008.

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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course : M.Sc. Code No. : 4PM1
 Semester : IV No. of hours allotted : 6
 Paper : Core 13 No. of credits : 4
 Title of the Paper : **Mathematical Statistics**

Course objective: To present the importance of theoretical approach in statistical methods.

Unit – I (18 Hours)

The Binomial and related distributions - Poisson distribution – The Gamma, Chi-square and Beta distributions – The Normal distribution – The multivariate normal distribution.

Unit – II (18 Hours)

The t and F distributions – Expectations of functions – Convergence in probability – Convergence in distributions – Central limit theorem.

Unit – III (18 Hours)

Sampling and statistics – Order statistics – More on confidence interval – Introduction to hypothesis testing – Additional comments about statistical tests.

Unit – IV (18 Hours)

Maximum likelihood estimation – Rao-Cramer lower bound and efficiency – Maximum likelihood tests – Measures of quality of estimators – A sufficient statistics for a parameter – Properties of a sufficient statistic.

Unit – V (18 Hours)

Most powerful tests – Uniformly most powerful tests – Likelihood Ratio tests – The sequential probability ratio test.

Text Book :

Introduction to Mathematical Statistics
 – R.V. Hogg, A.T. Craig and J.W. Mckean,
 Pearson Education, 2005

Unit	Chapter/Section
I	3(3.1 – 3.5)
II	3(3.6), 4(4.1 – 4.4)
III	5(5.1, 5.2, 5.4 – 5.6)
IV	6(6.1 – 6.3), 7(7.1 – 7.3)
V	8(8.1 – 8.4)

Reference Books :

- 1) Mathematical Statistics - S.C. Gupta and V.K. Kapoor, Sultan and Chand sons publishers, 2000.
- 2) Mathematical Statistics – J.N. Kapoor and H.C. Saxena, S. Chand & Co., 25th Edition, 2009.
- 3) John’s Freund’s Mathematical Statistics - Irwin Miller & Maryless Miller, Pearson Education, 2004.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course	: M.Sc.	Code No	: 4PM2
Semester	: III	No. of hours allotted	: 6
Paper	: Core 14	No. of credits	: 5
Title of the Paper	: Functional Analysis		

Course objective: To develop the skills in analyzing the basic structure of normed spaces and to get knowledge in using classes of functions rather than individual functions.

Unit – I (18 Hours)

Fundamentals of Normed Linear Spaces : Normed Linear Spaces – Continuity of Linear Maps.

Unit – II (18 Hours)

Hahn-Banach Theorems – Banach Spaces- Bounded Linear Maps on Banach Spaces : Uniform Boundedness Principle.

Unit – III (18 Hours)

Closed Graph Theorem – Open Mapping Theorem. Spaces of Bounded Linear Functionals : Duals and Transposes.

Unit – IV (18 Hours)

Geometry of Hilbert Spaces : Inner Product Spaces – Orthonormal Sets – Projection and Riesz Representation Theorems

Unit – V (18 Hours)

Bounded Operators on Hilbert Spaces: Bounded Operators and Adjoints – Normal, Unitary and Self – Adjoint Operators.

Text Book :

Functional Analysis - Balmohan Vishnu Limaye,
New Age International, 2nd Edition, 1996, Reprint 2012.

Unit	Chapter/Section
I	Chapter II – 5, 6
II	Chapter II- 7 (pages: 104 to 118), 8. Chapter III-9 (pages: 138 to 144)
III	Chapter III-10, Chapter IV- 13
IV	Chapter VI – 21, 22, 24(pages: 420 to 431)
V	Chapter VII-25, 26

Reference Books :

- 1) Introductory Functional Analysis with Applications - Erwin Kreyszig, John Wiley & Sons, Third Print, 2007.
- 2) Introduction to Topology and Modern Analysis – G.F. Simmons
Tata McGraw-Hill, 18th reprint 2012.
- 3) Foundations of Functional Analysis – S. Ponnusamy,
Narosa Publishing House, Reprint 2009.

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DEPARTMENT OF MATHEMATICS
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Course : M.Sc. Code No : 4PM3
Semester : IV No. of hours allotted : 6
Paper : Core 15 No. of credits : 4
Title of the Paper : **Measure and Integration**

Course objective : To make the students familiar with the concept of measure, measurable sets and functions, absolute continuity and Lebesgue integration.

Unit – I (18 Hours)

Lebesgue Measure : Introduction – Outer Measure – Measurable Sets and Lebesgue Measure – Nonmeasurable Sets – Measurable Functions – Littlewood’s three principles.

Unit – II (18 Hours)

The Lebesgue Integral : The Riemann Integral – The Lebesgue Integral of a Bounded Function over a set of finite measure – The Integral of a nonnegative function – The general Lebesgue Integral.

Unit - III (18 Hours)

Differentiation and Integration : Differentiation of Monotone Functions – Functions of Bounded Variation – Differentiation of an Integral – Absolute continuity.

Unit - IV (18 Hours)

General Measure and Integration : Measure Spaces – Measurable Functions – Integrations – General Convergence Theorems.

Unit – V (18 Hours)

Signed Measures – The Radon – Nikodym Theorem.
Measure and Outer Measure : Outer Measure and Measurability – The Lebesgue – Stieltjes Integral – Product Measures.

Text Book : Real Analysis - H.L. Royden
Prentice – Hall of India (P) Ltd., Third Edition, 2009.

Unit	Chapter/Section
I	3 (Full)
II	4 (1 - 4)
III	5 (1 - 4)
IV	11 (1 - 4)
V	11 (5, 6) and 12 (1, 3, 4)

Reference Books :

- 1) Measure and Integration – G.de Bara, Ellis Horwood Ltd., Second Edition, 2013.
- 2) Real and Complex analysis - Walter Rudin,
Tata McGraw – Hill 3rd Edition, Ninth Reprint, 2010.

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DEPARTMENT OF MATHEMATICS
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Course : M.Sc. Code No. :
 Semester : No. of hours allotted : 6
 Paper : Elective No. of credits : 5
 Title of the Paper : **Theory of Computation**

Course objective: To understand the notion of effective computability by studying Finite Automata, Grammars, Push Down Automata and Turing Machine.

Unit - I (18 Hours)

Finite Automata and Regular Expressions: Finite state systems – Basic definitions – Nondeterministic finite automata – Finite automata with ϵ moves – Regular expressions – Finite Automata with output.

Unit - II (18 Hours)

Properties of Regular Sets: The pumping lemma for regular sets – Closure properties of regular sets – Decision algorithm for regular sets – The Myhill-Nerode theorem and minimization of finite automata.

Unit –III (18 Hours)

Context-Free grammars: Context free grammars – Derivation trees – Simplification of context free grammars – Chomsky normal form – Greibach normal form.

Unit - IV (18 Hours)

Pushdown Automata: Definitions – pushdown automata and context free languages – The pumping lemma for CFL’s – Closure properties of CFL’s.

Unit – V (18 Hours)

Turing Machines: Introduction – The Turing machine model – Computable languages and functions. Undecidability- Problems, properties of recursive and recursively enumerable languages, Universal Turing Machines and an undecidable problem, Rice’s theorem and some more undecidable problems.

Text Book:

Introduction to Automata Theory, Languages, and Computation
 - John E. Hopcroft Jeffery D. Ullman, Narosa, 19th Reprint, 2002

Unit	Chapter/Section
I	Chapter 2 : 2.1 to 2.5 , 2.7
II	Chapter 3 : 3.1 to 3.4
III	Chapter 4 : 4.2 to 4.6
IV	Chapter 5 : 5.2,5.3 Chapter 6: 6.1,6.2
V	Chapter 7 : 7.1,7.2,7.3 Chapter 8: 8.1 to 8.4

Reference Books :

- 1) An Introduction to Formal Languages and Automata - Peter Linz , Jones and Bartlett, 4th Edition, 2006.
- 2) Fundamentals of the Theory of Computation: Principles and Practice - Raymond Greenlaw and H. James Hoover, Morgan Kaufmann Publishers, 2009.
- 3) Theory of Computation – D. P. Acharjya, MJP Publishers, 2010.

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DEPARTMENT OF MATHEMATICS
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Course : M.Sc. Code No. :
 Semester : No. of hours allotted : 6
 Paper : Elective No. of credits : 5
 Title of the Paper : **Differential Equations and Dynamical Systems**

Course objective: Developing knowledge to analyze the dynamical behavior of systems using differential equations.

Unit - I (18 Hours)
 Linear Systems: Uncoupled linear systems – Diagonalization – Exponential of Operators
 - The Fundamental theorem for linear systems – Linear System in \mathbb{R}^2 .

Unit - II (18 Hours)
 Linear Systems: Complex Eigenvalues – Multiple Eigen values – Jordan forms – Stability theory – Nonhomogeneous Linear Systems.

Unit – III (18 Hours)
 Nonlinear Systems : Local Theory : Some preliminary Concepts and Definitions – The fundamental Existence-Uniqueness theorem – Dependence on initial conditions and parameters – The maximal Interval of Existence.

Unit – IV (18 Hours)
 Nonlinear Systems : Local theory: The flow defined by a Differential equation – Linearization – The stable manifold theorem – The Hartman-Grogman theorem – Saddles, Nodes, Foci and Centers.

Unit – V (18 Hours)
 Nonlinear Systems: Global theory: Dynamical Systems and Global Existence Theorem – Limit sets And Attractors – Periodic Orbits, Limit Cycles and Separatrix Cycles – The Poincaré map.

Text Book :
 Differential Equations and Dynamical Systems - Lawrence Perko,
 Springer, 3rd Edition – 2001

Unit	Chapter/Section
I	Chapter 1: 1.1 to 1.5
II	Chapter 1 : 1.6 to 1.10
III	Chapter 2 : 2.1 to 2.4
IV	Chapter 2 : 2.5 to 2.10
V	Chapter 3: 3.1 to 3.4

Reference Books :

- 1) Ordinary Differential Equations and Dynamical Systems – Gerald Teschl, AMS, 2011
- 2) Differential Equations , Dynamical Systems and An Introduction to Chaos
 - Morris W. Hirsch, Stephen Smale, Robert L Devaney, Academic Press, 3rd Edition, 2013.
- 3) Introduction to Differential Equations with Dynamical Systems
 - Stephen L. Caompson & Richard Haberman, Princeton University Press, 2008

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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course : M.Sc. Code No :
 Semester : No. of hours allotted : 6
 Paper : Elective No. of credits : 5
 Title of the paper : **Combinatorics**
Course objective: To introduce combinatorial techniques for solving enumeration problems.

Unit - I (18 Hours)

General counting methods for arrangements and selections: Two basic counting principles – Simple arrangements and selections – Arrangements and selections with repetitions - Distributions – Binomial identities.

Unit - II (18 Hours)

Generating functions: Generating function models – Calculating Coefficients of Generating Functions – Partitions – Exponential Generating functions – A Summation Method.

Unit - III (18 Hours)

Recurrence Relations: Recurrence Relation Models – Divide-and-Conquer Relations – Solution of Linear Recurrence Relations – Solution of Inhomogeneous Recurrence Relations – Solutions with Generating Functions.

Unit - IV (18 Hours)

Inclusion-Exclusion: Counting with Venn diagrams – Inclusion-Exclusion Formula – Restricted Positions and Rook Polynomials.

Unit - V (18 Hours)

Polya’s Enumeration Formula: Equivalence and Symmetry Groups – Burnside’s Theorem – The Cycle Index – Polya’s Formula.

Text Book:

Applied Combinatorics – Alan Tucker – John Wiley & Sons, Inc., IV Edition, 2003

Unit	Chapter/Section
I	5(5.1 – 5.5)
II	6(6.1 – 6.5)
III	7(7.1 – 7.5)
IV	8(8.1 – 8.3)
V	9(9.1 – 9.4)

Reference Books :

- 1) Combinatorics – Theory and Applications – V. Krishnamurthy, East-West Press, 2000.
- 2) Introducing Combinatorics- Richard A. Brualdi, Pearson Education Inc., 2012.
- 3) Introduction to Combinatorial Mathematics – C.L. Liu, McGraw Hill, 1968.

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DEPARTMENT OF MATHEMATICS
(From 2014-16 batch onwards)

Course : M.Sc. Code No :
 Semester : No. of hours allotted : 6
 Paper : Elective No. of credits : 5
 Title of the Paper : **Fluid Dynamics**
Course objective : To understand abstract theory about fluids through vector concepts.

Unit – I (18 Hours)

Vector Analysis : General orthogonal curvilinear coordinates – Arc length in Orthogonal coordinates – Gradient in orthogonal coordinates – Divergence in orthogonal coordinates – Laplacian in orthogonal coordinates – Curl of a vector function in orthogonal coordinates – worked examples – Some cartesian tensor notation.

Unit – II (18 Hours)

Kinematics of fluids in Motion : Real fluids and Ideal fluids – Velocity of a fluid at a point – Streamlines and Pathlines , steady and unsteady flows – The velocity potential – The vorticity vector – Local and particle rates of change – The equation of continuity – worked examples – Acceleration of a fluid – Conditions at a rigid boundary.

Unit – III (18 Hours)

Equations of Motion of a Fluid : Pressure at a point in a fluid at rest – Pressure at a point in a moving fluid – Conditions at a boundary of two inviscid Immiscible fluids – Euler’s equations of motion – Bernoulli’s equation – worked examples – discussion of the case of steady motion under conservative body forces– some flows involving axial symmetry – Some special two-dimensional flows – Impulsive motion.

Unit – IV (18 Hours)

Some Three-Dimensional flows : Introduction – Sources, Sinks and doublets – Images in a rigid infinite plane – Images in solid spheres – Axi-Symmetric flows, Stoke’s Stream function.

Unit – V (18 Hours)

Some Two-Dimensional flows : Meaning of Two-Dimensional Flow – Use of Cylindrical Polar coordinates – The stream function – The complex potential for Two – Dimensional Irrotational, Incompressible flow – Complex velocity potentials for standard two-dimensional flows – Some worked examples – Two-Dimensional image systems - The Milne-Thomson circle theorem.

Text Book :

Textbook of Fluid Dynamics – F. Chorlton, CBS Publishers, 1985.

Unit	Chapter/Section
I	Chapter 1(Section 1.19 to 1.20)
II	Chapter 2(Section 2.1 to 2.10)
III	Chapter 3(Section 3.1 to 3.7, 3.9 to 3.11)
IV	Chapter 4(Section 4.1 to 4.5)
V	Chapter 5(Section 5.1 to 5.8)

Reference Books :

- 1) Fluid Dynamics – M. D. Raisinghania, S. Chand & Company Ltd, 1996.
- 2) Fluid Dynamics – J.K. Goyal and K. P. Gupta, Pragati Prakashan Publications, Seventh Edition, 1998.
- 3) A First Course in Fluid Dynamics – A. R. Paterson, Cambridge University Press, Reprint 1977.

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DEPARTMENT OF MATHEMATICS
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Course : M.Sc. Code No. :
 Semester : No. of hours allotted : 6
 Paper : Elective No. of credits : 5
 Title of the Paper : **Symmetries and Differential Equations**

Course objective: To acquire the knowledge about the symmetries of ODE, Lie symmetries, variational symmetries and their applications.

Unit – I (18 Hours)
 Symmetries of Planar Objects - Symmetries of the Simplest ODE - The Symmetry Condition for First - Order ODEs - Lie Symmetries Solve First-Order ODEs.

Unit – II (18 Hours)
 The Action of Lie Symmetries on the Plane - Canonical Coordinates - How to Solve ODEs with Lie Symmetries - The Linearized Symmetry Condition - Symmetries and Standard Methods - The Infinitesimal Generator.

Unit –III (18 Hours)
 The Symmetry Condition - The Determining Equations for Lie Point Symmetries - Linear ODEs - Justification of the Symmetry Condition.

Unit – IV (18 Hours)
 Reduction of order by Using Canonical Coordinates - Variational Symmetries, Invariant Solutions.

Unit – V (18 Hours)
 Differential Invariants and Reduction of Order - The Lie Algebra of Point Symmetry Generators - Stepwise Integration of ODEs.

Text Book : Symmetry Methods for Differential Equations – A Beginners Guide
 - Peter E. Hydon, Cambridge University Press, 2000.

Unit	Chapter/Section
I	Chapter 1 : 1.1 to 1.4
II	Chapter 2 : 2.1 to 2.6
III	Chapter 3 : 3.1 to 3.4
IV	Chapter 4 : 4.1 to 4.3
V	Chapter 5 : 5.1 to 5.3

Reference Books :

- 1) Symmetries and Differential Equations - George W. Bluman and Sukeyuki Kumei, Springer-Verlag, New York, 1989.
- 2) Symmetry and Integration Methods for Differential Equations
 - George W. Bluman & Stephen C. Anco, Springer- Verlag, 2002.
- 3) Applications of Lie Groups to Differential Equations - Peter J. Olver, Springer- Verlag, 2nd Edition , 1986.

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DEPARTMENT OF MATHEMATICS
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Course : M.Sc. Code No. :
Semester : No. of hours allotted : 6
Paper : Elective No. of credits : 5
Title of the Paper : **Algorithmic Graph Theory**

Course Objective: To study the advance Algorithmic approach in Graph theoretical problems and their efficiency by means of computational complexity.

Unit - I (18 Hours)

Graphs and their complements : Introduction – Degree sequence – Analysis – Paths and Walks: Introduction complexity – Walks – The shortest path problem – Weighted graphs and Dijkstra’s algorithm – Data structures – Floyd’s algorithm.

Unit - II (18 Hours)

Trees and Cycles: Spanning tree algorithms – Prim’s algorithm – Data structure – Kruskal’s algorithm – Data structure and complexity – The Cheriton – Tarjan algorithm.

Unit - III (18 Hours)

Connectivity: Introduction – Blocks – Finding blocks of a graph – The DFS (Depth First Search) – Complexity.

Unit - IV (18 Hours)

Hamiltonian cycles: Introduction – The crossover algorithm – Complexity – The Hamiltonian closure – The extended multi graph algorithm – Data structures for the segments – Decision problems – NP completeness – The travelling salesman problem – The TSP-Christofides algorithm.

Unit - V (18 Hours)

Network Flows: Introduction – The Ford-Fulkerson algorithm – Matching and flows – Menger’s theorems – Disjoint paths and separating sets.

Text Book:

Graphs, Algorithms and Optimization – William Kocay, Donald L. Kresner, Chapman & Hall/CRC, 2005

Unit	Chapter/Section
I	1: 1.1 to 1.3, 2: 2.1 to 2.7
II	4 : 4.4
III	6 : 6.1 to 6.4
IV	9 : 9.1 to 9.8
V	8: 8. 1 to 8.5

Reference Books:

- 1) Graphs: Theory and Algorithms – K. Thulasiraman and M.N.S. Swamy, John Wiley & Sons, 1992.
- 2) Algorithmic Graph Theory and Perfect Graphs – Martin Charles Golumbic, Academic Press, 2nd Edition, 2004.

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DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course : M.Sc. Code No. :
Semester : No. of hours allotted : 6
Paper : Elective No. of credits : 5
Title of the Paper : **Numerical Analysis**

Course objective : To develop Numerical computational skills and to study their applications.

Unit – I (18 Hours)

Number Systems and Errors: The representation of Integers - The representation of Fractions – Floating-Point Arithmetic – Loss of Significance and Error Propagation; Condition and Instability

Unit - II (18 Hours)

Interpolation by Polynomial : Polynomial Forms – Existence and Uniqueness of the Interpolating Polynomial – The Divided-Difference Table - The Error of the Interpolating Polynomial Interpolation in a Function Table Based on Equally Spaced Points (Excluding Fortran Programs in all the sections)

Unit – III (18 Hours)

The Solution of Nonlinear Equations : A Survey of Iterative Methods – Fixed –Point Iteration Convergence Acceleration for Fixed –Point Iteration – Polynomial Equations : Real Roots (Excluding Fortran Programs in all the sections)

Unit – IV (18 Hours)

Differentiation and Integration : Numerical Differentiation - Numerical Integration : Some Basic Rules - Numerical Integration : Gaussian Rules - Numerical Integration : Composite Rules (Excluding Fortran Programs in all the sections)

Unit – V (18 Hours)

The Solution of Differential Equations : Numerical Integration by Taylors Series – Error Estimates and Convergence of Euler’s Method – Runge-Kutta Methods – Step - Size Control with Runge-Kutta Methods (Excluding Fortran Programs in all the sections)

Text Book :

Elementary Numerical Analysis –An Algorithmic Approach
– Samuel D.Conte/Carl de Boor, ,Tata McGraw-Hill, Third Edition, 1981

Unit	Chapter/Section
I	1.1,1.2,1.3,1.4
II	2.1,2.2,2.3,2.5,2.6
III	3.1,3.3,3.4,3.6
IV	7.1,7.2,7.3,7.4
V	8.3,8.4,8.5,8.6

Reference books:

- 1) Introductory Methods of Numerical Analysis – S.S Sastry,
PHI Learning Private Ltd., Fourth Edition, 2009
- 2) Numerical Analysis – S. Arumugam, A. Thangapandi Isaac, A. Somasundaram
New Gamma Publishing House, 2007

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DEPARTMENT OF MATHEMATICS
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Course : M.Sc. Code No :
 Semester : No. of hours allotted : 6
 Paper : Elective No. of credits : 5
 Title of the Paper : **Nonlinear Differential Equations**

Course objective : To introduce the nonlinear ordinary differential equations and provides a prerequisite for further study in these areas
 To provide fundamental concepts and techniques for studying the stability analysis of differential equations

Unit – I (18 hrs)

Plane autonomous systems and linearization: The general phase plane-some population models – Linear approximation at equilibrium points – The general solution of linear autonomous plane systems.

Unit – II (18 hrs)

Averaging Methods: An energy balance method for limit cycles – Amplitude and frequency estimates: Polar Coordinates – An averaging method for spiral phase paths - Periodic solutions: harmonic– The equivalent linear equation by harmonic balance problems.

Unit – III (18 hrs)

Perturbation Methods: Non autonomous systems: forced oscillations - The direct perturbation method for the undamped Duffing’s equation - Forced oscillations far from resonance - Forced oscillations near resonance with weak excitation - The amplitude equation for the undamped pendulum - The amplitude equation for a damped pendulum - Periodic solutions of autonomous equations (Lindstedt’s method) - Forced oscillation of a self-excited equation - The perturbation method and Fourier series.

Unit – IV (18 hrs)

Stability : Poincaré stability (stability of paths) - Paths and solution curves for general systems - Stability of time solutions: Liapunov stability - Liapunov stability of plane autonomous linear systems - Structure of the solutions of n -dimensional linear systems.

Unit – V (18 hrs)

Structure of n -dimensional inhomogeneous linear systems - Stability and boundedness for linear systems - Stability of linear systems with constant coefficients - Linear approximation at equilibrium points for first-order systems in n variables - Stability of a class of non-autonomous linear systems in n dimensions - Stability of the zero solutions of nearly linear systems - Problems.

Text Book:

Nonlinear Ordinary Differential Equations: An Introduction for Scientists and Engineers,
 - D.W. Jordan and P. Smith, Oxford University Press, 2007.

Unit	Chapter/Section
I	Chapter 2(Section 2.1 to 2.4)
II	Chapter 4(Section 4.1 to 4.5)
III	Chapter 5(Section 5.1 to 5.6, 5.9 to 5.11)
IV	Chapter 8(Section 8.1 to 8.5)
V	Chapter 8(Section 8.6 to 8.11)

Reference Books:

- 1) Differential Equations - G.F. Simmons, Tata McGraw Hill, 1979
- 2) Ordinary Differential Equations and Stability Theory – D.A. Sanchez, Freeman, 1968.
- 3) Nonlinear Ordinary Differential Equations- R. Grimzhiaw, CRC Press, 1993.

THIAGARAJAR COLLEGE, MADURAI – 9.

(Re-Accredited with 'A' Grade by NAAC)

DEPARTMENT OF MATHEMATICS

(From 2014-16 batch onwards)

Course : M.Sc. Code No. :
Semester : No. of hours allotted : 6
Paper : Elective No. of credits : 5

Title of the Paper : **Differential Geometry**

Course objective : To introduce the curve in space, to find geodesics curvature, torsion of a curve and various applications in differential geometry

Unit – I (18 Hours)

The Theory of space curves : Definitions - Arc length – Tangent, normal and binormal – Curvature and Torsion of a curve – Contact between curves and surfaces – Tangent surface, involutes and evolutes – Intrinsic equations – Helices.

Unit – II (18 Hours)

The metric : Local intrinsic properties of a surface : Definition – Curves on a surfaces – Surface of revolution – Helicoids – Metric – Families of curves – Isometric correspondence – Intrinsic properties – Geodesics – Canonical geodesic equations – Existence theorem – Geodesic parallel – Geodesic curvature – Gauss–Bonnet theorem.

Unit - III (18 Hours)

The second fundamental form : Definition – Principal curvatures - Lines of curvature - Developables – Developable associated with space curves - Minimal surface – Ruled surface – Fundamental existence theorem for surfaces.

Unit - IV (18 Hours)

Differential geometry of surfaces in the large : Introduction - Compact surfaces whose points are umbilics – Hilbert’s Lemma – Complete surfaces of constant Gaussian curvature – Complete surfaces – Hilberts theorem – Conjugate points on geodesics.

Unit - V (18 Hours)

Tensor algebra: Vector space – Dual spaces – Tensor product of vector spaces – Transformation formulae – Contraction – Special tensors – Inner product

Text Book:

An introduction to Differential Geometry, T.J. Willmore, Oxford university press, 2010

Unit	Chapter/Section
I	I(I.2 – I.5, I.7 – I.9)
II	II(II.1 – II.5, II.7 –II.11, II.13 – II.16)
III	III(III.1 – III.5, III.7, III.8, III.11)
IV	IV(IV.1 – IV.5, IV.7, IV.8)
V	V(V.1 – V.5, V.7)

Reference Books :

- 1) Differential Geometry – Mittal and Agarwal, Krishna prakasam Publishers, 1998.
- 2) Differential Geometry - D. Somasundaram, Narosa Publishing House, 2009.
- 3) Differential Geometry - Thierry Aubin, American Mathematical Society, 2001.

M.Phil., Mathematics

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF MATHEMATICS
(From 2014-15 batch onwards)

M.Phil. MATHEMATICS
COURSE STRUCTURE (w.e.f. 2014 – 2015 batch onwards)

Semester – I

Code No	Subject	Contact Hrs / Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
1SMM1	Research Methodology	6		90	100	100	200
1SMM2	Advanced Analysis	6		90	100	100	200
	Total	12		180	200	200	400

Semester – II

Code No	Subject	Contact Hrs / Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
	Elective	6		90	100	100	200
	Dissertation				100	100	200
	Total	6		90	200	200	400

Elective papers: (One paper is to be chosen in Semester II)

1. Advanced Graph Theory
2. Stochastic Differential Equations
3. Computational Complexity

Question paper pattern:

5 Internal choice questions 5 x 20 = 100 Marks

THIAGARAJAR COLLEGE, MADURAI – 9.

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DEPARTMENT OF MATHEMATICS

(From 2014-15 batch onwards)

Course	: M.Phil.	Code No.	: 1SMM1
Semester	: I	No. of hours allotted	: 6
Paper	: Core 1	No. of credits	:
Title of the Paper	: Research Methodology		

Course objective: To pay due attention to designing and adhering to the appropriate methodologies throughout for improving the quality of research and to give a brief treatment of tensor products and simple properties of the formation of fractions.

Unit - I (18 hours)

Research Methodology: Meaning of Research – Objectives of Research – Motivation in Research – Types of Research – Research Approaches – Significance of Research – Research Methods versus Methodology – Research and Scientific Method – Importance of Knowing How Research is Done – Research Process – Criteria of Good Research – Problems- Encountered by Researchers in India – What is a Research Problem? – Selecting the Problem – Necessity of Defining the problem – Techniques Involved in Defining a Problem – Meaning of Research Design – Need for Research Design – Features of a Good Design – Import Concepts Relating to Research Design – Different Research Designs – Basic Principles of Experimental Designs.

Unit – II (18 hours)

LATEX : The Basics – The Document – Bibliography – Bibliographic Databases – Table of contents , Index and Glossary – Displayed Text – Rows and Columns – Typesetting Mathematics.

Unit - III (18 hours)

Modules : Modules and module homomorphisms - Submodules and quotient modules - Operations and submodules – Direct sum and product – Finitely generated modules – Exact sequences – Tensor product of modules –Restriction and extension of scalars – Exactness properties of the tensor product – Algebras – Tensor product of algebras .

Unit - IV (18 hours)

Rings and Modules of fractions: Local properties – Extended and contracted ideals in rings of fractions - Primary Decomposition.

Unit - V (18 hours)

Chain conditions - Noetherian rings – Primary Decomposition in Noetherian rings – Artin rings.

Text Books:

- 1) Research Methodology, Methods and Techniques (Second Revised Edition) - C.R. Kothari, New Age International Publishers, Reprint 2010
- 2) LATEX Tutorials, A Primer - Indian TEX Users Group, 2003
- 3) Introduction to Commutative Algebra - M.F. Atiyah and I.G. GeMacdonald, Addison – Wesley Publishing Company, 1969

Unit	Book	Chapter/Section
I	1	Chapters 1, 2 and 3
II	2	Chapters I - VIII
III	3	Chapter 2
IV	3	Chapters 3 and 4
V	3	Chapters 6,7 and 8

Reference Books:

- 1) Research Methodology - R. Panneerselvam, Prentice Hall of India, 2007
- 2) Algebra - Thomas W. Hungerford, Springer International edition, 2008
- 3) Algebra- Serge Lang, Springer International edition, Revised Third Edition, 2010

THIAGARAJAR COLLEGE, MADURAI – 9.

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DEPARTMENT OF MATHEMATICS

(From 2014-15 batch onwards)

Course	: M.Phil.	Code No.	: 1SMM2
Semester	: I	No. of hours allotted	: 6
Paper	: Core 2	No. of credits	:
Title of the Paper	: Advanced Analysis		

Course objective : To study certain topological-algebraic structures and the methods by which knowledge of these structures can be applied to analytic problem.
To study the basic properties of Fourier transform.

Unit - I **(18 hours)**

Banach Algebras: Definition and examples – Regular and singular elements – Topological divisors of zero – The spectrum – The formula for the spectral radius – The radial and semi-simplicity.

Unit – II **(18 hours)**

The Gelfand mapping – Application of the formula $r(x) = \lim \|x^n\|^{1/n}$ - Involution in Banach algebras- The Gelfand Neumark theorem – Ideals in $C(X)$ and the Banach-Stone theorem

Unit – III **(18 hours)**

Positive Borel Measures: The Riesz representation theorem- Regularity Properties of Borel Measures-Lebesgue measure- Continuity properties of measurable functions.

Unit – IV **(18 hours)**

Convex functions and inequalities - The L^p Spaces – Approximation by continuous functions.

Unit – V **(18 hours)**

Fourier transforms: Formal properties – The inversion theorem – The Plancherel theorem – The Banach Algebra L^1 .

Text Books:

- 1) Introduction to Topology and Modern Analysis -G.F. Simmons, Tata McGraw – Hill edition, Eighteenth Reprint 2012.
- 2) Real and Complex analysis - Walter Rudin, Tata McGraw – Hill 3rd Edition, Ninth Reprint, 2010.

Unit	Book	Chapter/Section
I	1	12 (Full)
II	1	13 (Full), 14(section 74)
III	2	2(Full)
IV	2	3 (Full)
V	2	9 (Full)

Reference books:

- 1) Functional Analysis - Walter Rudin, Tata McGraw-Hill, II edition, 2006.
- 2) Functional Analysis – Kosaku Yoshida, Springer Verlag, 2008
- 3) Introductory Functional Analysis with Applications - Erwin Kreyszig, John Wiley & Sons, Third Print, 2007.

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DEPARTMENT OF MATHEMATICS

(From 2014-15 batch onwards)

Course : M.Phil. Code No. :
Semester : II No. of hours allotted : 6
Paper : Elective No. of credits :
Title of the Paper : **Advanced Graph Theory**

Course objective:

- To introduce the recent developments in Graph theory
- To inculcate research attitude in Domination, factorization and graceful Labeling, theory of Ramsey number and digraphs

Unit - I (18 hours)

Domination in Graphs: Dominating sets in graphs – Bounds on the domination number in terms of order, size, degree, diameter and girth.

Unit – II (18 hours)

Conditions on dominating sets: Introduction – Independent dominating sets – Total dominating sets – Connected dominating sets.

Unit – III (18 hours)

Factorization and decomposition of graphs – Graceful labeling of graphs – Harmonious labeling of graphs.

Unit - IV (18 hours)

Classical Ramsey numbers – Generalized Ramsey theory – Rainbow Ramsey numbers.

Unit - V (18 hours)

Strong digraphs – Tournaments – Hamiltonian tournaments.

Text Books:

1. Fundamentals of domination in graphs
- T. W. Haynes, S. T. Hedetniemi and Peter J. Slater
Marcel Dekker Inc, New York, 1998.
2. Graphs & Digraphs – G. Chartrand and L. Lesniak
IV Edition, Chapman & Hall/CRC, 2005

Unit	Book	Chapter/Section
I	1	1.2, 2.1 – 2.4
II	1	6.1 – 6.4
III	2	9.2, 9.3
IV	2	12.1, 12.2, 12.3
V	2	5.1, 5.2, 5.3

Reference Books :

- 1) Theory of domination in graphs - V. R. Kulli,
Vishwa International Publications, Gulbarga, 2010
- 2) Basic Graph Theory – K.R. Parthasarathy
Tata McGraw – Hill publishing Company, 1994

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DEPARTMENT OF MATHEMATICS

(From 2014-15 batch onwards)

Course : M.Phil. Code No :
Semester : II No. of hours allotted : 6
Paper : Elective No. of credits :
Title of the Paper **Stochastic Differential Equations**

Course objective:

- To understand the concept of Itô integrals and its properties
- To inculcate research attitude in Stochastic differential equations

Unit – I (18 hours)

Introduction: Stochastic Analogs of Classical Differential Equations – Filtering Problems – Stochastic Approach to Deterministic Boundary Value Problems – Optimal Stopping – Stochastic Control and Mathematical Finance – Some mathematical preliminaries: Probability Spaces, Random Variables and Stochastic Processes and an Important Example: Brownian Motion.

Unit – II (18 hours)

Itô Integrals: Construction of the Itô integral – Some Properties of the Itô Integral and Extensions of the Itô Integral.

Unit – III (18 hours)

The Itô formula and the Martingale Representation Theorem: The 1- dimensional Ito Formula – The Multi dimensional Ito Formula and the Martingale Representation Theorem – Stochastic Differential Equations: Examples and Some Solution Methods – An Existence and Uniqueness Result and Weak and Strong Solutions.

Unit – IV (18 hours)

The Filtering problem: Introduction – The 1- dimensional Linear Filtering Problem and the Multi- dimensional Linear Filtering Problem.

Unit – V (18 hours)

Diffusions: Basic Properties – The Markov Property – The Strong Markov Property – The Generator of an Ito Diffusion – The Dynkin Formula – The Characteristic Operator.

Text Book:

Stochastic Differential Equations - An Introduction with Applications – Bernt Oksendal, Springer-Verlag, Sixth Edition, 2003.

Unit	Chapter/Section
I	Chapter 1&2
II	Chapter 3
III	Chapter 4 &5
IV	Chapter 6
V	Chapter 7

Reference books:

- 1) Modeling with Itô Stochastic Differential Equations – E. Allen, Springer, 2007
- 2) Stochastic Differential Equation and Applications – Xuerong Mao, Woodhead Publishers Ltd., 2010
- 3) Theory Stochastic Differential Equation with Jumps and Applications – Rong Situ, Springer-Science, 2005

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DEPARTMENT OF MATHEMATICS
(From 2014-15 batch onwards)

Course : M.Phil. Code No. :
Semester : II No. of hours allotted : 6
Paper : Elective No. of credits :
Title of the Paper : **Computational Complexity**

Course objective: To understand complexity in computation

Unit - I (18 hours)

Turing Machines: The standard Turing Machine – Combining Turing Machines for Complicated Tasks - Turing’s Thesis.

Unit - II (18 hours)

Other Models of Turing Machines: Monor Variations on the Turing Machine Theme – Turing Machines with More Complex Storage.

Unit - III (18 hours)

Hierarchy of Formal Languages and Automata: Recursive and Recursively Enumerable Languages – Unrestricted Grammars – Context-Sensitive Grammars and Languages – The Chomsky Hierarchy.

Unit - IV (18 hours)

Limits of Algorithmic Computation: Some Problems that cannot be solved by Turing Machines – Undecidable Problems for Recursively Enumerable Languages – The Post Correspondance Problem – Undecidable Problems for Context-Free Languages – A question of efficiency.

Unit – V (18 hours)

An Overview of Computational Complexity: Efficiency of computation – Turing Machine Models and Complexity – Language Families and Complexity Classes – The Complexity Classes P and NP – Some NP Problems – Polynomial-Time Reduction – NP-Completeness and an Open Question.

Text Book: An Introduction to Formal Languages and Automata – Peter Linz,
Jones and Bartlett Publishers, Fourth Edition, 2006

Unit	Chapter/Section
I	9
II	10
III	11
IV	12
V	14

Reference book:

Fundamentals of Computer Algorithms
- Ellis Horowitz, Sartaj Sahani and Sanguthevar Rajasekaran, Galgotia, 2007

B.C.A.

THIAGARAJAR COLLEGE, MADURAI – 9.

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DEPARTMENT OF MATHEMATICS

(From 2014-17 batch onwards)

COURSE STRUCTURE(w.e.f. 2014-2017 batch onwards)

Semester –I

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Part I Tamil	P111	Ikkala Ilakkiyam	5	2	75	25	75	100
Part II English	P211	English Through Prose	4	2	60	25	75	100
Allied	SAM11	Discrete Mathematics	5	4	75	25	75	100
Core	SMM11	Programming in C (Theory)	4	4	60	25	75	100
Core	SMM12	Introduction to Digital Principles & Microprocessor	4	4	60	25	75	100
LAB	SMML11	C Lab	4	3	60	40	60	100
Value Education I	VE 1	Value Education I	2	2	30	15	35	50
EVS	ES 1	Environmental Studies	2	2	30	15	35	50
Total			30	23				

Semester –II

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Part I Tamil	P111	Bakthi Ilakkiyamum Sitirilakkiyamum	5	2	75	25	75	100
Part II English	P211	English Through Drama	4	2	60	25	75	100
Allied	SAM21	Resource Management Techniques	5	4	75	25	75	100
Core	SMM21	Computer Organization	4	4	60	25	75	100
Core	SMM22	Oops with C++	5	5	75	25	75	100
LAB	SMML21	C++ Lab	5	3	75	40	60	100
Skill Based Elective	SBE 1	Skill Based Elective**	2	2	30	15	35	50
Total			30	22				

Semester –III

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Allied	SAM31	Numerical Methods	5	4	75	25	75	100
Core	SMM31	Client/Server Technology	4	4	60	25	75	100
Core	SMM32	Data Structures	4	4	60	25	75	100
Core	SMM33	Visual Basic	4	4	60	25	75	100
LAB	SMML31	Data Structure Lab using C++	5	2	75	40	60	100
LAB	SMML32	Visual Basic Lab	4	2	60	40	60	100
Value Education II	VE 2	Value Education II	2	2	30	15	35	50
Non Major Elective	NME 1	Principles of Computers	2	2	30	15	35	50
Total			30	24				

Semester –IV

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Allied	SAM41	Management Accounting	5	4	75	25	75	100
Core	SMM41	Software Engineering	4	4	60	25	75	100
Core	SMM42	Java Programming	4	3	60	25	75	100
Core	SMM43	Multimedia Technology	4	3	60	25	75	100
Core Elective 1	ESM41	Elective*	5	4	75	25	75	100
LAB	SMML41	Java Lab	4	2	60	40	60	100
Skill Based Elective	SBE 2	Skill Based Elective**	2	2	30	15	35	50
Non Major Elective	NME 2	Fundamentals of Internet	2	2	30	15	35	50
Total			30	24				

Semester –V

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Core	SMM51	Software Testing Techniques	4	4	60	25	75	100
Core	SMM52	Advanced Java Programming	4	4	60	25	75	100
Core	SMM53	Database Management Systems	4	4	60	25	75	100
Core		Project	6	4	90	25	75	100
LAB	SMML51	RDBMS Lab	5	2	75	40	60	100
LAB	SMML52	Advanced Java Programming Lab	5	2	75	40	60	100
Value Education III	VE 3	Value Education III	2	2	30	15	35	50
Self Study Paper		Computers and Internet Applications*	-		-	-	100	100
Total			30	22				

* Carries Extra 5 Credits that do not form part mandatory credits (140) required for completion of the course

Semester –VI

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Core	SMM61	Data Communication & Networks	5	5	75	25	75	100
Core	SMM62	.Net Technology	5	5	75	25	75	100
Core	SMM63	Operating System	4	4	60	25	75	100
Core	SMM64	Web Designing	4	4	60	25	75	100
LAB	SMML61	Web Designing Lab	5	2	75	40	60	100
LAB	SMML62	.Net Programming Lab	5	2	75	40	60	100
Skill Based Elective	SBE 3	Skill Based Elective**	2	2	30	15	35	50
Total			30	24				

LIST OF NON-MAJOR ELECTIVE PAPERS(NME) (2 Hrs / Week) (III & IV Semester)

1. PRINCIPLES OF COMPUTERS
2. FUNDAMENTALS OF INTERNET

***-LIST OF ELECTIVE PAPERS (5 Hrs / Week)**

(One Elective Paper to be chosen in IV Semester)

1. MULTIMEDIA LAB
2. MOBILE COMPUTING
3. COMPILER DESIGN
4. SYSTEM SOFTWARE

**** -LIST OF SKILL BASED ELECTIVES (SBE) (2 Hrs / Week)**

(One Elective Paper to be chosen in II,IV,VI Semester)

1. DIGITAL DESIGN- Lab
2. PC SOFTWARE-Lab
3. MATHEMATICAL APTITUDE AND SELF DEVELOPMENT
4. MATHEMATICAL APTITUDE AND INTERVIEW SKILLS
5. E-COMMERCE
6. DATA MINING
7. TALLY- PRACTICALS
8. ORACLE.

A) CONSOLIDATION OF CONTACT HOURS AND CREDITS: UG

Semester	Contact Hrs/ Week	Credits
I	30 hrs.	23
II	30 hrs.	22
III	30 hrs.	24
IV	30 hrs.	24
V	30 hrs.	22
VI	30 hrs.	24
Part – V	--	1
Total	180 hrs	140

B) Curriculum Credits: Part wise

Part I	Tamil	2x2 = 04 Credits
Part II	English	2x2 = 04 Credits
Part III	Core	= 93 Credits
	Allied	4x4 = 16 Credits
	Core Electives	1x4 = 04 Credits
Part IV	Value Education	3x2 = 06 Credits
	Environmental studies	1x2 = 02 Credits
	Skill Based Electives	3x2 = 06 Credits
	Non – Major Electives	2x2 = 04 Credits
Part V		1x1 – 01 Credits
	Total	140 Credits

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF MATHEMATICS
BACHLOR OF COMPUTER APPLICATION
(From 2014 – 2017 batch onwards)

Course	: I BCA	Code. No	: SAM11
Semester	: I	No. of. Hours	: 5 hrs/ week
Paper	: Allied(1)	Credits	: 4
Title of the Paper	: Discrete Mathematics		

Course objective: Introducing fundamental concepts of mathematics which are essential for computer science students.

Unit I: Logic **16 hrs**

Introduction – IF statement – connectives – Atomic and Compound Statements – Well Formed Formula – Truth Tables – Tautology & Contradiction. Tautological Implications and Equivalence Formula Replacement Process – Functionally complete sets and duality law.

Unit II: Normal Forms **14hrs**

Normal forms – Principal of Normal Forms – Theory of Inference

Unit III: Matrix Algebra **15 hrs**

Introduction – Matrix Operations – Inverse of a Square Matrix – Elementary Operations and Rank of a Matrix – Simultaneous Linear Equations – Inverse by Partitioning – Eigen Values and Eigen Vector (Proofs of the theorems or not included – problems only)

Unit IV: Graph Theory **15 hrs**

Basic Concepts – Matrix Representation of Graphs (Proofs of the theorems or not included)

Unit V: Automata theory **15 hrs**

Introduction – Finite Automaton- Definition of Finite Automaton – Representation of Finite Automaton – Acceptability of a String by a Finite Automaton – Languages Accepted by a Finite Automaton - Nondeterministic Finite Automaton(NFA) –Acceptability of a String by an NFA.

Text Book:

Discrete Mathematics - Dr. M. K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran
Publisher: The National Publishing Company (2000 edition – Reprinted in May 2009)

Unit I Chapter IX : Sections 1-10

Unit II Chapter IX : Sections 11, 12, 13

Unit III Chapter VI : Sections 1 - 7

Unit IV Chapter XI : Sections 1, 2

Unit V Chapter XII : Sections 1-8

Reference Books:

1. Introduction to Discrete Mathematics – M.K.Sen and B.C. Chakraborty , Books and Allied (P) Ltd. Company (Reprinted in 2010).
2. Discrete Mathematics with Graph theory and combinatrics – T. Veerarajan , Tata McGraw Hill education (P) Ltd. Company (Tenth reprint in 2010).

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DEPARTMENT OF MATHEMATICS
BACHLOR OF COMPUTER APPLICATION
(From 2014 – 2017 batch onwards)

Course	: I BCA	Code.	: SMM11
Semester	: I	No. of. Hours	: 4 hrs/ week
Paper	: CORE (1)	Credits	: 4
Title of the Paper	: Programming in C		

Course objective :

- ❖ To understand and apply advanced programming concepts.
- ❖ To understand the concept like pointers, structure, files and link list

Unit - I: Introduction and C Fundamentals

12 hrs

Introduction to C- The C Character set – Identifiers and Keywords – Data types – Constants – Variables- Declaration – Expressions – Various Type of Operators.

Data Input, Output and Control Statements:

Preliminaries – Reading & Writing a Character – Formatted Input / Output data – The gets and puts functions- Decision Making and Looping (While & Do) – Nested For looping – Switch – Break -Continue –Go to.

Unit - II: Arrays & Strings

12 hrs

Array-Introduction – One dimensional array – two dimensional array - multi dimensional arrays, Handling of character strings – declaring, reading strings – arithmetic operation on characters – string handling functions.

Unit - III: Functions

12 hrs

Function - Introduction - Form of C Functions – Returns Values and Types – Calling a Functions Category of functions with, without arguments – handling of non integer functions – Nesting of functions Recursion.

Unit – IV: Structures & Pointers

16 hrs

Structure-Introduction – Structure definition – giving values to members – structure initialization Comparison of structure variables – Arrays of structures – Array with in structures – pointer introduction understanding pointers – declaring and initializing pointers – Accessing a variable.

Unit - V: File Management

8 hrs

File Management: Introduction – Defining and opening a file – Closing a file – input , output operations.

Text Book: E. Balagurusamy , Programming in C, Second Edition, Tata McGraw – Hill Publishing Company Limited, New Delhi- Second Reprint 1993.

Unit I	Ch 1-6
Unit II	Ch 7.1 to 7.7, 8.1 to 8.8
Unit III	Ch 9.1 – 9.16
Unit IV	Ch10.1 to 10.9, 11.1 to 11.6.
Unit V	Ch 12.1 to 12.4

Reference Books:

1. Byron S. Gottfried, Programming with C, Third edition, Tata McGraw – Hill Publications.,2010
2. Yashwant Kanetkar, Let Us C, Thirteenth edition, BPB Publications, Delhi 2012.

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DEPARTMENT OF MATHEMATICS
BACHLOR OF COMPUTER APPLICATION
(From 2014 – 2017 batch onwards)

Course	: I BCA	Code. No	: SMM12
Semester	: I	No. of. Hours	: 4 hrs/
week			
Paper	: CORE (2)	Credits	: 4
Title of the Paper	: Introduction to Digital Principles & Microprocessor		

Course objective :

- ❖ To know the different techniques of digital circuit analysis & Microprocessor.

Unit I: Number representation **10 hrs**

Number systems and codes – Binary to decimal conversion- Decimal to Binary conversion- – Octal numbers – Hexadecimal numbers-BCD – ASCII code-Excess 3 code – Gray code – ASCII.

Unit II: Combinational logic circuit **10 hrs**

Basic gates, Universal logic gates, Invert gates-Booleans laws and theorem – Sum of products method – Product of sums methods- Boolean simplification K. Map.

Unit III: Data processing circuits & Sequential Logic **10 hrs**

Data processing circuits-Multiplexer, De multiplexer, Decoder, BCD to Decimal decoders-seven segment decoders-encoders - Exclusive OR gates – Parity generators – checkers-Flip –flops: RS, Gated Flip-Flop,D, Edge Trigered RS-JK, Master-Slave JK..

Unit IV: **18 hrs**

Introduction to microprocessors and microcomputers:- General architecture of microcomputer system- Evaluation of intel micro processor Architecture--introduction-software, the microcomputer program-internal architecture of 8088/8086 microprocessor-software model of the 8088/8086 microprocessor-memory address space and data organization-data types-segment registers and memory segmentation-dedicated and general use of memory-instruction pointer-data registers-pointer and index registers-status register-generating a memory address-the stack-input/output address space-addressing modes of the 8088/8086.

Unit V: **12 hrs**

8086 microprocessor programming I:- Data transfer instructions-arithmetic instructions-logic instructions-shift instructions-rotate instructions-flag control instructions-compare instructions-jump instruction-subroutines and subroutine handling instructions-the loop and the loop handling instructions.

Text Book:

Albert Paul Malvino, Donald P.Leach, Digital Principles and Applications, Sixth Edition,2006, Tata Mc-Graw Hill.

UNIT SECTION

Unit I	: Chap 5.1 to 5.8 (From Text Book 1)
Unit II	: Chap 2.1 to 2.3 & 3.1 to 3.8 (From Text Book1)
Unit III	: Chap 4.1to 4.8, 8.1 to 8.5, 8.7 (From Text Book 1)
Unit IV	: Chap 1, 2 & 3.5 (From Text Book 2)
Unit V	: Chap 4 & 5 (From Text Book 2)

Reference Book:

Morris Mano, Digital Logic & Computer Design, Fifth edition, Prentice Hall of India, 2012 publishing.

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DEPARTMENT OF MATHEMATICS
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(From 2014 – 2017 batch onwards)

Course : I BCA
Semester : I
Paper : LAB
Title of the Paper : **C LAB**

Code. No : SMML11
No. of. Hours : 4 hrs/ week
Credits : 3

1. Standard Deviation.
2. Prime Number
3. Adam Number.
4. Armstrong Number.
5. Perfect Number.
6. PASCAL’s Triangle
7. Multiplying two matrices & transpose of the matrix.
8. Linear search & Binary search.
9. Sum of Digit.
10. Reverse the Digit.
11. Binary to decimal... etc.
12. Sin series, Cos Series.
13. Quadratic Equation using switch.
14. Magic Square
15. Team wise Player Display – Structures & Files.
16. Stack, Queue Implementation using array.
17. String manipulation using Pointers & Arrays.
18. Library System using Data files – Structure
19. Inventory system using Data files – Structure.
20. Banking system using Data files, Structure.
21. Students Marks Processing, Structure.
22. Employee Salary Bill Processing, Structure.
23. Counting the No. of Words, characters, Spaces, Lines Alphabetsin Text files.

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DEPARTMENT OF MATHEMATICS
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(From 2014 – 2017 batch onwards)

Course : I BCA **Code. No : SAM21**
Semester : II **No. of. Hours : 5 hrs/ week**
Paper : Allied(2) **Credits : 4**
Title of the Paper : Resource Management Techniques

Course objective :

- ❖ To introduce the fundamental concepts of operations research.

Unit-I **12 hrs**

Operations Research an overview – Origin and development of OR – Applications of OR – Opportunities and short comings of OR - Linear Programming Problem – Mathematical Formulation – Graphical Solution.

Unit-II **16 hrs**

General LPP – Canonical and Standard Forms of LPP – Insights into the simplex Method – Introduction for simplex method - Fundamental properties of solutions (problems only) – The Computational Procedure – Use of Artificial Variables (Problems only).

Unit-III **17 hrs**

Duality in linear programming problem – Introduction – General primal-dual Pair - Formulating a dual Problem – Primal dual pair in matrix form – Duality and simplex method - Dual simplex method (Problems only).

Unit-IV **18 hrs**

Transportation Problem – Introduction – General transportation Problem – The Transportation Table – Loops in transportation table – Triangular basis - Solution of transportation problem – Finding an initial basic feasible Solution – Test for optimality – Economic interpretation - Degeneracy in transportation problem – Transportation algorithm (Modi Method) – Some exceptional cases.

Unit-V **12 hrs**

Assignment problem – Introduction – Mathematical formulation of the Assignment problem – Solution methods of assignment problem – Special cases in Assignment Problems.

Text Book: Operations Research by Kanti Swarup, P.K.Gupta, Man mohan - Thirteenth Thoroughly Revised Edition (Reprinted in 2008) - Publisher: Sultan Chand & Sons company.

UNIT	SECTION
I	Chapter 1 : 1.1, 1.2,1.10 and 1.11 and Chapter 2. Chapter 3 : 3.1 to 3.3.
II	Chapter 3 : 3.4 to 3.6 Chapter 4 : 4.1 to 4.4
III	Chapter 5 : 5.1 to 5.4 , 5.7 ,5.9
IV	Chapter 10:10.1, 10.2, 10.5 to 10.13 and 10.15
V	Chapter 11: 11 .1 to 11.4

Reference Books:

1. Operations Research – Theory and application by J. K. Sharma (fourth edition – Reprinted in 2010) – Publisher: Macmillan publishing company.
2. Introduction to Operations Research – A computer oriented algorithmic approach by Billy E. Gillett (Eighth reprint in 1989) – Publisher: Tata McGraw Hill publishing company (p) Ltd Company.

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Course	: II BCA	Code. No	: SMM21
Semester	: II	No. of. Hours	: 4 hrs/ week
Paper	: Core(3)	Credits	: 4
Title of the Paper	: COMPUTER ORGANIZATION		

Course objective :

- ❖ To become familiar with different kinds of computer organization and their applications.
- ❖ To increase the understanding of basic concepts.

Unit I: **12 hrs**

Fundamentals: Functional Units – Operational Concepts – Bus Structures – Computer types – stacks and queues – subroutines.

Unit II: **10 hrs**

Processing Unit: Fundamental concepts – Execution of a complete instruction – Hardwired control – Micro programmed control.

Unit III: **12 hrs**

I / O Organization: Accessing I / O devices – Interrupts - DMA

Unit IV: **10 hrs**

Memory Management : Basic concepts – RAM – ROM – Cache Memories – Virtual memories.

Unit V: **16 hrs**

Arithmetic and Pipelining: Design of Fast adders – Multiplication of positive numbers– Integer division-Basic concepts of Pipelining .

Text Book:

V. Carl Hamacher, Zronko G. Vranesic, Sofwat O. Zaky , Computer Organization, Tata McGraw- Hill Publication, Fifth Edition, 2002

Unit I : 1.1 to 1.4, 2.8, 2.9

Unit II : 7.1, 7.2, 7.4, 7.5

Unit III : 4.1, 4.2, 4.4

Unit IV : 5.1 to 5.5, 5.7

Unit V : 6.2 , 6.3, 6.6 & 8.1

(Excluding Processor Examples and Performance Considerations)

Reference Books:

- M. Morris Mano, Computer System Architecture, Third edition, 2007, DORLING KINDERSLEY (RS)
- [HAYERS](#), COMPUTER ARCHITECTURE & ORG 3rd Edition, 2012, TMH

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Course : I BCA Code. No : SMM22
Semester : II No. of. Hours : 5 hrs/ week
Paper : Core (4) Credits : 5
Title of the Paper : **OOPS WITH C++**

Course objective :

- ❖ To understand the concepts like data abstraction, inheritance & polymorphism

Unit I: 15 hrs

Software Crisis – Software Evolution – Basic Concepts of Object – Oriented Programming – Benefits of OOP – Object Oriented Languages – Applications of OOP – Structure of C++ program – Creating the source file Compiling and Linking Tokens – Keywords – Identifiers – Basic Data Types – User Defined Data Types Derived Data Types – Symbolic Constants – Types Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Operators in C++ - Manipulators – Type Cast Operator – Expressions and Implicit Conversions – Operator Overloading – Control Structures – The Main Function – Function Prototyping – Inline Functions – Function overloading – Friend and Virtual functions.

Unit II: 15 hrs

Specifying a class – Defining Member functions – Marking an outside function Inline – Nesting of Member functions – Private member functions – Arrays within a Class – memory Allocation for objects Static Data Members – Static member function arrays of objects – objects as function arguments – friendly functions returning objects consent member functions pointers to members – constructors in a class – constructors and Destructors.

Unit III: 15 hrs

Defining Operator Overloading – Overloading unary operators – overloading Binary Operators Overloading Binary operators – overloading binary operators using friends – manipulation of strings using operators - rules for overloading operators – Defining derived classes single inheritance – multilevel inheritance – multiple inheritance. Hierarchical inheritance.

Unit IV: 15 hrs

virtual base classes – constructors in derived classes – member classes-Nesting of classes. Pointer to objects – this pointer – pointers to derived classes – virtual functions – pure virtual function C++ stream classes – unformatted I/ O operations – managing output with manipulators.

Unit V: 15 hrs

Classes of file stream operations – opening and closing a file – detecting end of file – more about open File modes file pointers and their manipulation – sequential input and output operations – updating a file-Random access – Error handing during file operations – command line arguments.

Text Book: E.Balagurusamy OBJECT ORIENTED PROGRAMMIGN WITH C++, Tata McGraw – Hill publishing company Limited. Fifth edition, 2009

Unit I : 1-4

Unit II : 5-6

Unit III : 7.1 to 7.7 & 8.1 to 8.8

Unit IV : 8.9 To 8.12 ,9 , 10

Unit V : 11

Reference Books:

Herbert schildt ,C++ The complete Reference , fourth edition, Tata Mcgraw Hill Education Private Limited, 2003.

Yashwant kanetkar, Let us C++, Second edition, 2012,BPB Publications

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DEPARTMENT OF MATHEMATICS
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Course	: I BCA	Code. No	: SMML21
Semester	: II	No. of. Hours	: 5 hrs/ week
Paper	: LAB	Credits	: 3
Title of the Paper	: C++ LAB		

1. Program to demonstrate all manipulators in C++
2. Swap Two values using call by value & call reference method.
3. Evaluate a expression using macros in C & inline function in C++
4. Perform stack and Queue operation using arrays and pointers.
5. Compare any two elementary data types in C++ using function overloading.
6. Find m power n values using default arguments.
7. Program to perform Simple banking operation.
8. Perform the following Complex operations using operator overloading +=, -=, *=, /=, >, <, >=, <=, !=, ==
9. Overload the redirection operation >> and << for any class.
10. Type Conversion Program.
11. Programs using multiple inheritance, hybrid inheritance, Hierarchical inheritance, multilevel inheritance
12. Program using Polymorphism and Virtual functions.
13. Text File No, of digits, Characters, Words, Lines, etc.,
14. Program to merge two data files.
15. Singly sorted linked list, Circular linked list
16. Bubble Sort Implementation.
17. Merging & Sorting.
18. Compress and Decompress a Textile (byte size before & after Compression).
19. Program using Bit wise operators.

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Course	: II BCA	Code. No	: SAM31
Semester	: III	No. of. Hours	: 5 hrs/ week
Paper	: Allied(3)	Credits	: 4
Title of the Paper	: NUMERICAL METHODS		

Course objective :

Introducing fundamental concepts of Numerical methods such as solving algebraic equations, interpolation, differentiation and integration.

Unit I: (Solution of an algebraic equation) 15 hrs

Bisection method – False Position method – Successive approximation method – Newton-Raphson method – Horner’s method (Problems only).

Unit II: (Solution of simultaneous linear algebraic equations) 15 hrs

Introduction - Gauss elimination method – method of triangularisation – Jacobi’s method – Gauss Seidel method – finite differences – difference table - backward differences (problems only).

Unit III: (Interpolation) 17 hrs

Introduction – Linear interpolation –Gregory-Newton forward interpolation – Gregory-Newton backward interpolation – Divided differences – Newton’s interpolation formula for unequal intervals – Lagrange’s interpolation formula – Inverse interpolation (problems only).

Unit IV: (Numerical differentiation and Integration) 14 hrs

Newton’s forward and backward difference formulae to compute the derivatives - Trapezoidal rule – Simpson’s 1/3 rule (problems only).

Unit V: (Numerical solution of ordinary differential equations) 14 hrs

Solution by Taylor series – Euler’s method – Runge -Kutta method (second and fourth orders only) – Milne’s Predictor - Corrector method (problems only).

Text Book:

Numerical Methods in Science and Engineering by Dr. M.K. Venkataraman (Fifth edition - Revised and enlarged edition – Reprinted in 2008). Publisher: The National publishing company.

Unit I : Chapter III - 1 to 5 and 8 (Horner’s method)

Unit II : Chapter IV - 1 to 4 and 6
Chapter V - 1 to 7.

Unit III : Chapter VI - 1 to 5
Chapter VIII - 1,3,4 and 5(Inverse interpolation)

Unit IV : Chapter IX - 1,2,3,7,8 and 10

Unit V : Chapter XI - 6, 10 to 15, 19 and 20.

Reference Books:

1. Applied numerical analysis by Curtis F. Gerald, Patrick O. Wheatley (2004 edi.) – Pearson publication.
2. Numerical methods by Dr. S. Arumugam, A. Thangapandi Isaac and A. Somasundaram (2001 edition) – Scitech publications India (P) ltd.

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Course	: II BCA	Code.No	: SMM31
Semester	: III	No. of. Hours	: 4 hrs/ week
Paper	: Core(5)	Credits	: 4
Title of the Paper :	CLIENT SERVER TECHNOLOGY		

Course Objective:

- To enable to student to understand the concept of client server technology
- To enable them to know in detail about client server computing.

UNIT 1: 14 hrs

Client/Server system concepts: Introduction – concepts – N-tier vs. 2-Tier Client/server Architecture – 2-Tier Architecture – 3-Tier Architecture – Case study of N-Tier Architecture – Client/server Models – Types of Servers and Clients-: Client/Server building blocks – Hardware, software, Middleware.

UNIT 2: 15 hrs

Client/Server System Architecture: – Operating System Services – Base Services – External Services – Server Scalability.-Types of Middleware –Transaction Processing Monitors-MOM-ODBC – Needs for Database Connectivity – Design Overview of ODBC - Architecture - Components – Applications - Driver Managers – Drivers – Data Source – ODBC 2.5 and ODBC 3.0.

UNIT 3: 17 hrs

Client/Server Database: SQL Database Servers - Server Architecture – Multithread Architecture – Hybrid Architecture – Stored Procedures – Triggers – Rules of processing – Transaction Models – Chained and Nested Transactions – Transaction Management Standards .

UNIT 4: 15 hrs

Data warehousing & Client/Server Protocols: Distributed Database characteristics – Data Warehousing – Data Mining.-.Object Database.

UNIT 5: 14 hrs

Recent Trends in Client/Server Computing: Application of client server technology in Intranet, Extranet, Internet.

Text Books:

1. Robert Orfali, Dan Harkey and Jerri Edwards, “Essential Client/Server Survival Guide”, John Wiley and Sons Inc., 1996.
2. Alex Berson, “ Client/Server Architecture”, Third Edition, Tech Media ,2010.

Unit I	: 2,3	(Book 1)
	client server models	(Book 2)
Unit II	: 5, 16	(Book 1)
	MOM & Odbc	(Book 2)
Unit III	:10,15	(Book 1)
Unit IV	:12,24	(Book 1)
Unit V	26,27	(Book 1)
	Others	(Book 2)

Reference Books:

1. Client/Server Databases by Joe Salemi, Tech Media,2000
2. Client/Server Databases Patrick Smith et al. x, ,Dream Tech,1998

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(From 2014 – 2017 batch onwards)

Course	: I BCA	Code. No	: SMM32
Semester	: III	No. of. Hours	: 4 hrs/ week
Paper	: CORE (6)	Credits	: 4
Title of the Paper	: DATA STRUCTURES		

Course objective :

- ❖ To become familiar with data structures and their applications

UNIT – I : Introduction **12 Hrs**

Definitions – Concept of Data Structures – Overview of Data Structures – Implementation. Arrays: Definition – Terminology – One-Dimensional Array – Multi-Dimensional Arrays – Pointer Arrays. Linked Lists: Definition – Single Linked List –Circular Linked List – Double Linked List – Circular Double Linked List.

UNIT – II : Stacks & queues **12 Hrs**

Introduction – Definition – Representation of Stack – Operations on Stacks –Applications of Stacks – Evaluation of Arithmetic Expression – Implementation of Recursion. Queues: Introduction - Definition – Representation of Queues – Various Queue Structures.

UNIT – III : Trees **12 Hrs**

Trees: Definition – Binary Trees – Properties – Representation – Operations – Threaded Binary Trees – Trees and Forest.

UNIT – IV : Graphs **12 Hrs**

Introduction – Terminologies – Representation- Linked Representation – Matrix Representation – Operations on Matrix Representation of Graphs.

UNIT – V **12 Hrs**

Sorting: Insertion Sort - Shell Sort – Heap Sort – Merge Sort – Quick Sort- Sorting Large Structures – Bucket Sort – External Sorting.

TEXT BOOKS

1. D.Samanta, “Classic Data Structures”, Prentice-Hall India Pvt Ltd, Sixth Printing, August 2005.
2. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C“, Pearson Education, Second Edition, Reprint 2002.(Unit V)

UNIT **SECTION**

Unit I	:	Ch 1, 2, 3.1 to3.5 (From Text Book1)
Unit II	:	Ch4,5(From Text Book1)
Unit III	:	Ch7.1 to 7.6(From Text Book1)
Unit IV	:	Ch 8.1 to 8.4(From Text Book1)
Unit V	:	Ch 7(From Text Book 2)

REFERENCE BOOKS

1. John Paul Tremly and Paul G.Sorenson, “An Introduction to Data Structures with Applications”,TMH, 1995.
2. Horowitz.E. and Sahani, “Fundamentals of Data Structures”, Galgotia Pub-1982.

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DEPARTMENT OF MATHEMATICS
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Course	: II BCA	Code. No	: SMM33
Semester	: III	No. of. Hours	: 4 hrs/ week
Paper	: CORE (7)	Credits	: 4
Title of the Paper	: VISUAL BASIC		

Course objective:

- ❖ To understand visual basic concept.
- ❖ Develop skill to write visual basic program

Unit I: **10 hrs**

Introduction to Visual Basic: Integrated Development Environment (IDE) forms and controls –Variables in Visual Basic –Procedure– Strings – Conditional Statements – Looping.

Unit II: **14 hrs**

Forms and Menus: MDI Forms-Creating Forms Using Code-Menu-Menu Editor

Unit III: **10 hrs**

Selecting & Using controls: Text boxes – Command buttons – option buttons – check boxes–list boxes – combo boxes – Image objects – picture boxes – Timer – scroll bars.

Unit IV: **12 hrs**

Introduction to Built In Active X Control: Common Dialog control – Chart and Grid control – Frame Controls-Shape Controls-Toolbar-Status Bar-Image Lists-Tree Views –List Views.

Unit V: **14 hrs**

Introduction To Database: Working With Data Controls-DAO- ADO-Activex

Text Book: STEVEN HOLZNER,VISUAL BASIC 6 BLACKBOOK, Dream Tech press – Reprinted 2009.

UNIT SECTION

Unit I : 1-3
Unit II : 4-5
Unit III : 6-10
Unit IV : 11,12,14,15,16
Unit V : 20,24,26

Reference Book:

GanyCornell, Visual Basic 6 Ground up. Tata Mc Graw Hill Publising Company limited 1991; Reprinted 2008.

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Course	: II BCA	Code. No	: SMML31
Semester	: III	No. of. Hours	: 5 hrs/ week
Paper	: LAB	Credits	: 2
Title of the Paper	: Data Structure Lab using C++		

- ❖ Perform Various operations on one Dimensional arrays
- ❖ Perform Various operations on two Dimensional arrays
- ❖ Perform various operations on Stacks
- ❖ Perform various operations on Queues
- ❖ Perform various operations on Linked Lists
- ❖ Perform various operations on Circular Linked Lists
- ❖ Perform various operations on Doubly Linked Lists
- ❖ Perform various operations on Circular Doubly Linked Lists
- ❖ Perform various operations on Binary Trees
- ❖ Sorting a set of numbers using various methods

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Course	: II BCA	Code. No	: SMML32
Semester	: III	No. of. Hours	: 4 hrs/ week
Paper	: LAB	Credits	: 2
Title of the Paper : VISUAL BASIC LAB			

1. Simple Arithmetic Operations (+, -, /, *) using text Command Boxes.
2. Manipulation of String and Date functions.
3. Designing of a Calculator.
4. Using file, Directory, Drive List boxes, to load a text file into a Rich Text Box.
5. Design a text editor using Rich Text Box.
6. Functions of Common dialogue box (Open, Save, color, Font, Printer & Help options)
7. Design a Screen Saver.
8. Animation of Picture.
9. Use list box, Combo box to change the font, font size of the given text.
10. Display a pop up menu in the form when you click the right mouse button.
11. Database Access using ADO, DAO, RDO
12. Program for OLE, ActiveX DLL.
13. Compare the scores of two cricket teams, by the using of Graphs.

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Course : II BCA Code. No : SMM41
Semester : IV No. of. Hours : 4 hrs/
week
Paper : Core (8) Credits : 4
Title of the Paper : **SOFTWARE ENGINEERING**

Course Objective:

- ❖ To become familiar with software engineering methods, procedures & tools
- ❖ To become aware of current trends and technologies in software engineering.

Unit 1: 12 hrs

Introduction to Software engineering:- Some definition – Some Size factors – Quality to Productivity Factors – Managerial issue.

Planning a Software Project:

Defining the Problem – Developing a solution Strategy – Planning the development process – planning an Organizations Structure – Other planning activities.

Unit II: 12 hrs

Software Cost Estimation : Software Cost factors - Software cost estimation Techniques – Staffing level estimation -Estimative software maintenance costs.

Unit III: 12 hrs

Software requirements definition : The Software requirements specification – Formal Specification Techniques.

Unit IV: 12 hrs

Software Design: Fundamental Design Concepts - Modules and modularizing Criteria – Design Notations - Design Techniques – Detailed Design Consideration – Real time and distributed system design – test plan – milestones, walkthrough and Inspection – Design guide lines.

Unit V: 12 hrs

Verification and Validation Techniques: Qualification Assurance – Unit Testing and Debugging – System Testing.

Software maintenance: Enhancing maintainability during development – Managerial aspects of software maintenance - configuration management – source code metrics - other maintenance tools and techniques.

Text Book : Richard E. Fairly, Software engineering Concepts, Tata McGraw - Hill Education, First edition, 1985

Unit Chapters

Unit I : 1,2

Unit II : 3

Unit III : 4.1,4.2

Unit IV : 5

Unit V : 8.1,8.2 ,8.5,8.6, 9

Reference Book:

[Roger S. Pressman](#), Software Engineering 6th Edition, Tata Mcgraw Hill Education Private Limited, 2012

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Course : II BCA Code. No : SMM42
Semester : IV No. of. Hours : 4 hrs/ week
Paper : Core(9) Credits : 3
Title of the Paper : JAVA PROGRAMMING

Course Objective:

- ❖ To understand Java application programs
- ❖ To become familiar about AWT & Applets

Unit I: Introduction: 8 hrs

JAVA language – JAVA Revolution – Object oriented fundamentals – Java Language Introduction- Types – Operations – Flow control.

Unit II: Packages and Interface: 12 hrs

Classes & Objects: Object References-Instance variables-Methods-Overloading-Inheritance– packages and interfaces.

Unit III: Strings & Threads: 12 hrs

Exception Handling-String Handling- Threads and Synchronization :Single Thread Event-Thread Priorities-Thread Communications

Unit IV: FILES: 14 hrs

Utilities.-Input / Output :File-I/O Streams

Unit V: Applet &AWT: 14 hrs

Applet: Applet Tags-Applet Methods-Color-Font-Abstract window Toolkit: Components-Layout-Event Handling

Text Book:

[Patrick Naughton](#),The JAVA Handbook 1st Edition, Tata McGraw - Hill Education, 1997

Unit Chapters

Unit I : 1-6

Unit II : 7,8

Unit III : 9,10,11

Unit IV : 12,13

Unit V : 15,16

Reference Book:

[HERBERT SCHILDT](#), Java 2: The Complete Reference 5th Edition, Tata Mcgraw Hill Education Private Limited, 2002

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Course : II BCA Code. No : SMM43
Semester : IV No. of. Hours : 4 hrs/ week
Paper : Core(10) Credits : 3
Title of the Paper : **MULTIMEDIA TECHNOLOGY**

Course Objective:

- ❖ To understand basis of Multimedia environment and to familiar with Different medias.

UNIT-I 10 hrs

Introduction :What is multimedia – where to use multimedia - Introduction to making multimedia – multimedia skills – About fonts ,faces – using text in multimedia – font editing tool – hypermedia, hypertext.

UNIT-II 12hrs

Multimedia Hardware: Hardware connections, memory and storage device –Input Output devices –Basic software tools for multimedia.

UNIT-III 12 hrs

Authoring tools and sound: making instant multimedia – Types authoring tools – features – cross –platform authoring tool - Sound – Digital Sound – MIPI versus digital.

UNIT-IV 14 hrs

Animations and video: Animation principles – animation by computer Video - How video works – video broadcast standards – analog video – digital video.

UNIT –V 12 hrs

Internet and Multimedia: Internet tools for world wide web – web server – browsers – plug_ Ins - Animation, video presentations – 3D world – Designing for web – working on web – text for web – images for web – sound for web – animation for web.

Text Book:

Tay Vaughan, Multimedia :Making it Work (With CD) 8th Edition, : Tata McGraw - Hill Education, 2007

Unit	Chapters
I	1,2,3,4
II	9,10
III	11,5
IV	7,8
V	13,14

Reference Book:

David Hillman, Multimedia Technology & Applications 1st Edition, Galgotia Publications Pvt. Ltd.201

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Course	: II BCA	Code. No	: SMML41
Semester	: IV	No. of. Hours	: 4 hrs/ week
Paper	: LAB	Credits	: 2
Title of the Paper	: JAVA Lab		

Simple programs

1. Java Program to Print Multiplication Table.
2. Java Program to find odd or even number using switch

Classes & objects

3. Java Program to find the area of a room.
4. Java Program for student processing system.
5. Java Program for invoice.
6. Java Program for employee pay bill process.

Inheritance

7. Java Program for hospital management.

Polymorphism

8. Java Program for function overloading process

Package & Interface, Exception

9. Java Program for Package
10. Java Program for interface
11. Java Program for an user defined Exceptions

Array & I/O

12. Java Program for Array of objects.
13. Java Program for simple Quiz.

Threads

14. Java multithread Program.
15. Java Program for thread synchronization.

Applet

16. Java Program for applet lifecycle.
17. Java Program for simple Arithmetic operations.
18. Java Program for font, color options.
19. Java Program for menu card.
20. Java Program for mouse Event.
21. Java Program for graphical shapes.

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DEPARTMENT OF MATHEMATICS
BACHLOR OF COMPUTER APPLICATION
(From 2014 – 2017 batch onwards)

Course	: III BCA	Code. No	: SMM51
Semester	: V	No. of. Hours	: 4 hrs/ week
Paper	: Core(11)	Credits	: 4
Title of the Paper : SOFTWARE TESTING TECHNIQUES			

Course Objective:

Understanding the various software testing Techniques

UNIT- I

Building a Software Testing Strategy – Software Testing Design Techniques – Software Testing Tools and Selection of Test Automation Products – Software Testing Lifecycle and Software Testing Process

UNIT -II

Testing Effort Estimation and Test Planning – Software Test Effort Estimation Technique

UNIT -III

Pre-Development Testing Requirements and Design Phase – Best Practices in Program-Phase Unit, System and Integration Testing

UNIT -IV

Choosing a Load Testing Strategy – Dodging the Bullets – Validating Mission-Critical-Server Software for Reliability

UNIT -V

Testing of Web-based Applications — Testing Metrics, Best Practices and Benchmarks

Text Book:

Renu Rajani and Pradeep, Software Testing Effective Methods, Tools and Techniques, Oak Tata McGraw-Hill,2004.

UNIT	SECTION
Unit I	: Ch 1-4
Unit II	: Ch 5-6
Unit III	: Ch 7-8
Unit IV	: Ch 13-15
Unit V	: Ch 18, Ch 21

Reference Books:

- Lee Copeland , [A Practitioner's Guide to Software Test Design](#), STQE Publishing, 2003
- Glenford Myers, [The Art of Software Testing](#), 2nd edition, Hardcover, 2004

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DEPARTMENT OF MATHEMATICS
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(From 2014 – 2017 batch onwards)

Course : III BCA Code. No : SMM52
Semester : V No. of. Hours : 4 hrs/
week
Paper : Core (12) Credits : 4
Title of the Paper : **ADVANCED JAVA PROGRAMMING**

Course Objective:

- ❖ To understand the basics of JSP2.0 and to get the basic ideas about advanced java components.

UNIT: I 12 hrs

ACCESS DATA BASE WITH JDBC:

Overview – JDBC driver – Connecting to Databases – Statement interface – Result set – Metadata – tour of swing – JAPPLET – text field - Button – Combo – tanned porn – tree – table

Unit: II 14hrs

SERVLETS:

Introduction to remote method invocation - simple client server Application – life cycle – Simple servlets – servlets API – Java x servlets package – parameter – Java x servlets – http package – working with cookies- session tracking.

Unit :III **JAVA NETWORKING:** 8Hrs

Ip Address-Data Gram-Socket-URL-URL Connection-HTTP,UDP protocols

UNIT: IV 12 hrs

INTRODUCTION TO JSP2.0:

Syntaxes and semantics – Development model – Component – example – Expression – Script lets Declaration

UNIT: V 14hrs

Session Tracking and API and JSDDL:

Request dispatching session and thread management session- tracking – API – Thread management multithread Application

TEXT BOOKS

1. Phil Hanna, JSP 2.0: The Complete Reference, Mcgraw-hill Osborne Media, Second edition 2002

2. Java 2: The Complete Reference 5th Edition, HERBERT SCHILDT, Publisher: Tata Mcgraw Hill Education Private Limited, 2002

Unit I : JSP2.0 (Complete reference) - chapter 15

The Complete Reference Java 2 – chapter 26

Unit II: The Complete Reference Java 2 – chapter 24, 27

Unit III: The Complete Reference Java 2 - chapter 18

Unit IV: JSP2.0 (Complete reference) - chapter 5, 6

Unit V: JSP2.0 (Complete reference) - chapter 7, 8

Reference Book:

Hans Bergsten, Java Server Pages, 3rd Edition 3 Revised Edition, O'reilly Vlg. Gmbh & Co., 2003

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Course : III BCA Code. No : SMM53
 Semester : V No. of. Hours : 4 hrs/ week
 Paper : Core(13) Credits : 4
 Title of the Paper : **DATABASE MANAGEMENT SYSTEMS**

Course Objective:

- ❖ To understand basis of database and to become familiar with data models.

Course Content:

Unit I **12 Hrs**

Introduction: Database System Applications – Purpose of Database Systems – View of Data– Database Languages – Relational Databases – Database Design – Data storage and Querying – Database Users and Administrators– Transaction Management – Database users - Database users and Architectures – History of Database System.

Entity-Relationship Model: Overview of Design process - E-R model – constraints – E-R diagrams.

Unit II **12 Hrs**

Relational Database Design: Features of good Relational designs – Atomic domains and First Normal Form – Decomposition using functional dependencies – Functional dependency theory – Algorithm for Decomposition.

Unit III **12 Hrs**

Recovery Systems: Failure Classification-Storage-Recovery and Atomicity-Recovery Algorithm-Buffer Management.

Unit IV **12 Hrs**

Database System Architecture: Centralized and Client-Server architecture – Server system architecture – parallel systems – Distributed systems.

Parallel databases: Introduction-I/O parallelism – Interquery Parallelism – Intraquery parallelism.

Unit V **12Hrs PL/SQL:**

PL/SQL – Triggers – Stored Procedures and Functions – Package – Cursors

Text Books

1. Database System Concepts – Silberschatz Korth Sudarshan, International (6th Edition) McGraw Hill Higher Education, 2013.
2. “Oracle 8i The complete reference“, Kevin Loney and George Koch, Tata McGraw Hill, 2004.

UNIT **SECTIONS**

Unit I : 1.1 to 1.9, 1.12,1.13, 7.1 to 7.3, 7.5
 Unit II : 8.1 to 8.5
 Unit III : 16.1 to16.5
 Unit IV : 17.1 to 17.4, 18.1 to 18.4.
 Unit V : ch.25,26,27

Reference Books

1. “ Jose A.Ramalho – Learn ORACLE 8i BPB Publications 2003”
2. “Database Management Systems”, Ramakrishnan and Gehrke, McGraw Hill, Third Edition, 2003.

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(From 2014 – 2017 batch onwards)

Course : III BCA
Semester : V
Paper : LAB
Title of the Paper : **RDBMS Lab**

Code. No : SMML51
No. of. Hours : 5 hrs/ week
Credits : 2

SQL & PL/SQL

1. Program using conditional control, Iterative controls & sequential controls.
2. Programs using exception handling.
3. Programs using explicit cursor & Implicit cursors.
4. Programs using PL / SQL tables and records.
5. Programs using Database Triggers.
6. Program to design procedures using In, Out parameter.
7. Program to design procedure-using functions.
8. Program to design procedures using packages.

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Course : III BCA Code. No : SMML52
Semester : V No. of. Hours : 5 hrs/ week
Paper : LAB Credits : 2
Title of the Paper : **ADVANCED JAVA PROGRAMMING LAB**

Swing

Write a **Swing program** to Display the Error Message when you omit textbox input.

Write a **Swing program** to Design a calculator.

Write a **Swing program** to insert ,delete records from the employee **database**.

Write a **Swing Program** to Design a College Application Form.

write a **Swing program** to Display the Error Message when you

Give textbox **input value >5**

Write a **Swing program** to insert ,delete records from the Student **database**.

JDBC

Write a JDBC program to insert ,update the employee records based on our choice

RMI

Generate a Multiplication Table Using **RMI**.

Generate a Multiplication of TWO Numbers Using **RMI**.

JSP

Write a **jsp** program to insert ,List Item details using inventory database.

Write a **jsp** program to Print the Current Date using user defined function

Write a **jsp** program to print the list of cube values in table form.

Write a JSP program to give the demo for include Action.

Write a **JSP program** to add Two Values sent from HTML.

Write a **JSP program** to give demo for Include Directory.

Write a **Servlet program** to Implement the Simple QUIZ.

Write a **JSP program** to print the **Greetings for the Given number** of times.

Write a **Servlet program** to Implement the **Session Tracking Mechanism**

Write a jsp program to implement the inventory process(**bill for selected item**) using **html**.

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(From 2014 – 2017 batch onwards)

Course	: III BCA	Code. No	: SMM61
Semester	: VI	No. of. Hours	: 5 hrs/ week
Paper	: Core(14)	Credits	: 5
Title of the Paper : DATA COMMUNICATION & NETWORKS			

Course Objective:

- ❖ To enable the students explain the concept of networking.
- ❖ To know about the current trends.

Unit-I: 14 hrs

Why study data communications -Data communication -Networks –Protocols and Standards. Basic Concepts: Line configuration -Topology –Transmission mode -Categories of networks -Internetworks -The OSI Model: The model- Functions of the layers -TCP/IP protocol suite.

Unit-II: 15 hrs

Transmission media: Guided Media -Unguided media –Transmission impairment - Performance –Wavelength.Error detection and correction: Types of Errors -Detection –Vertical Redundancy Check (VRC) -Longitudinal Redundancy Check (LRC) –Cyclic Redundancy Check (CRC) -Checksum -Error correction.

Unit-III: 17 hrs

Data Link control: Line discipline -Flow control -Error control ,**Switching:** Circuit switching -Packet switching -Message Switching.

Unit-IV: 15 hrs

Point-to-Point Protocol: (PPP) Transition states, PPP Layers, Link Control Protocol (LCP) -Authentication -Network Control Protocol (NCP) –An Example.

Networking and Internetworking devices: Repeaters -Bridges -Routers - Gateways -Other devices -Routing Algorithms -Distance Vector Routing - Link State Routing.

Unit-V: 14 hrs

TCP/IP Protocol Suite: Overview of TCP/IP -Network Layer -Addressing- Subnet - Other Protocols in the Network Layer -Transport Layer. **Application Layer:** Client/Server Model – Bootstrap protocol (BOOTP) Domain Name System (DNS) - Telnet -File Transfer Protocol (FTP) - Simple Mail Transfer Protocol (SMTP) --Hyper Text Transfer Protocol (HTTP) -World Wide Web (WWW)

Text Book:

[FOROUZAN](#), DATA COMMUNICATION & NETWORKING, 2 nd Edition,Tata McGraw Hill Publishing Company Limited, 2004

Unit-I : 1.1 to 1.4,2.1 to 2.5, 3.1 to 3.3 .

Unit-II : 7.1 to 7.5 , 9

Unit-III : 10 ,14

Unit IV: 15, 21

Unit V: 24,25.1-25.5,25.7,25.9,25.10

Reference Book:

[Andrew S. Tanenbaum](#), [David J. Wetherall](#), Computer Networks 5th Edition, Pearson, 2011

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DEPARTMENT OF MATHEMATICS
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Course	: III BCA	Code. No	: SMM62
Semester	: VI	No. of. Hours	: 5 hrs/ week
Paper	: CORE (15)	Credits	: 5
Title of the Paper	: .NET TECHNOLOGY		

Course Objective:

- ❖ To enable the students explain the concept of networking
- ❖ To know about the current trends.

UNIT - I: 14 hrs

A Quick Introduction to .NET : Dispelling the Myth of the .NET Virtual Machine - Microsoft Intermediate Language (IL). - An Introduction to .NET Memory Management - The .NET Framework Type System -The .NET Framework System Objects -**The Common Language Runtime** : Overview. - The CLR in Relation to .NET.**IL Intermediate Language** : Language Inter-Op - Hello IL – Functions – Classes – ILDASM – Metadata - Reflection API.

UNIT – II 17 hrs

THE C# LANGUAGE: C# Basics:The C# Type System - Programming Concepts - Arrays - struct Classes – Interfaces - Delegates.

UNIT – III 15 hrs

WINDOWS FORMS : Introduction to Windows Forms :The Hello Windows Forms Application - Creating and Using an Event Handler - Defining the Border Style of the Form - Adding a Menu - Adding a Menu Shortcut - Handling Events from Menus-: Dialogs - Creating Dialogs.,.

UNIT – IV 15 hrs

User Interfaces & Introducing Visual Studio.NET &: Using Controls -The Integrated Development Environment (IDE) : Section A: The Main Editing Area - Section B: Solutions – Classes – Items - Help. Section C: The Toolbox and Server Explorer - Section D: Tasks – Output - Search Results, - Watches - Section E: Properties - Dynamic Help – Favorites - Debugging Programs.

UNIT - V 14 hrs

ADO.NET-Data Access with ADO.Net-Understanding Database-Architecture of ADO.Net-Database Manipulation-ADO.Net Connections-Creating a command-Data Adapter-Data Reader.

TEXT BOOK

1.Bob Powell, Richard L Weeks, Robert Powell - C# and the .Net Framework - SAMS Publishing , 2000

2..NET 4.5 Programming BlackBook,dreamtech Press 2013

Chapters:

Unit – I :1.1 , 1.2 & 1.3(From Book 1)

Unit- II : 2.1 (From Book 1)

Unit- III : 3.1, 3.2 .1 To 3.2.8 (From Book 1)

Unit – IV : 3.2.9 To 3.2.10 & 1.5(From Book 1)

Unit- V : Ch 12(From Book 2)

REFERENCE BOOKS:

1. Tony Baer, et al - Understanding the .NET Framework,2004,TBH

2. Thuan Thai, Hoang Lam - .NET Framework Essentials, 2005, TMG

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Course	: III BCA	Code. No	: SMM63
Semester	: VI	No. of. Hours	: 4 hrs/week
Paper	: Core (16)	Credits	: 4
Title of the Paper : OPERATING SYSTEM			

Course Objective:

- ❖ To develop fundamental knowledge of operating system
- ❖ To become familiar with memory management and other related concepts
- ❖ To become familiar with File management

Unit-I **8 hrs**

Introduction: -Introduction- Operating System Structures: System Components - Operating System Services – System Calls – System Structure – Virtual Machine

Unit – II **12 hrs**

Process Management :- Process Concept- Process Scheduling – Inter Process Communication – Threads : Overview – CPU Scheduling : Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Deadlocks: System model – Deadlock Characterization – Methods of handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection.

Unit – III **12 hrs**

Memory Management : - Address Binding – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory : Background – Demand Paging

Unit – IV **14 hrs**

Device and File Management :- File System interface : File Concepts – Access Methods – Directory Structure – File Sharing – File System Implementation : File System Structure – File System Implementation – Mass Storage Structure : Disk Structure – Disk Scheduling.

Unit – V **14 hrs**

Distributed System Structures and Security:- Distributed Structures-Background-Security Problems-User Authentication- Threats-Securing system-Intrusion Detection-Cryptography.

Text Book:

Silberchatz A. Peterson J. L . Galvin . P.,Operating System Concepts. Addison Wiley, 6 th Edition,2001.

Unit – I: 1.1 – 1. 8, 3.1,3.2,3.3,3.5,3.6

Unit- II: 4.1, 4.2, 4.5, 5.1, 6.1,6.2,6.3, 8.1, 8.2,8.3,8.4,8.5,8.6

Unit- III: 9.1, 9.2 - 9.6, 10.1,10.2

Unit – IV: 11.1, 11.2, 11.3, 11.5, 12.1, 12.2, 14.1, 14.2.

Unit- V: 15.1 19.1 to 19.7.

Reference Book:

Milan Milankovic ,Operating System Concepts and Design, Tata McGraw – Hill, 1997.

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Course	: III BCA	Code. No	: SMM64
Semester	: VI	No. of. Hours	: 4 hrs/ week
Paper	: Core(17)	Credits	: 4
Title of the Paper	: WEB DESIGNING		

Course Objective:

- ❖ To create inline, internal & external style sheets.
- ❖ To understand the value of typography in web page design
- ❖ To Build style sheets to maintain continuity across your web site

Unit I: **12 hrs**

Introduction to Web Technologies & HTML:

Introduction – History – OSI Reference Model–TCP/IP Model–Web Browser–HTTP–
Exploring Web Technology–Introduction to Web Services–Services supported by IIS–HTML–
Headings–Hyperlinks–Images–Tables–Frames–Forms & Controls.

Unit II: CSS & Java Script: **12 hrs:**

CSS–IntroducingDHTML–JavaScript–HandlingEvents–Variables–Array–Objects–
Operators–Statements–Functions.

Unit III: **12 hrs**

Introduction to PHP:

Introduction – Features of PHP-Creating PHP Script–Running a PHP Script–Variables
and Constants–Types–Operators–Control Flow Statement.

Unit IV: **12 hrs**

PHP Functions, Arrays, Directories, Forms:

User Defined Function – Built-in Function - Arrays- Files & Directories–Web Forms–
Creating Text Boxes, Radio Buttons, Check Boxes–Processing a Web Forms–Validating a Form.

Unit V: **12 hrs**

PHP Databases, Exploring Cookies, Sessions:

Databases- PHP &MYSQL- Database Manipulations- Cookies- Sessions- Differentiate
Cookies & Sessions.

Text Books:

1. Web Technologies-BlackBook, (DreamTechPress), 2014

Unit I Ch. 1 (Pg.No 1 to 15), Ch 2(Pg.No 41 to 97)

Unit II Ch. 2(Pg.No 98 to 154)

Unit III Ch.3, 4, 5

Unit IV Ch 6, Ch 7(Pg.No 235 to 245)

Unit V Ch. 7(Pg.No 246 to 257),Ch 8(Pg.No 261 to 270)

Reference Book:

1.S.Padma Priya,Web Technology, First Edition, SciTech Publications,2013

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Course	: III BCA	Code. No	: SMML61
Semester	: VI	No. of. Hours	: 5 hrs/ week
Paper	: LAB	Credits	: 2
Title of the Paper	: WEB DESINGING LAB		

1. Creating Dynamic Web site for a shopping mall using DHTML.
2. Creating web page using XML.
3. Web pages validation using Java script
4. Creating a style sheet using java script
5. Creating forms using java script
6. Create a web site for our college with minimum number of pages.

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Course	: III BCA	Code. No	: SMML62
Semester	: VI	No. of. Hours	: 5 hrs/ week
Paper	: LAB	Credits	: 2
Title of the Paper : .NET PROGRAMMING LAB			

Console Applications

Simple Programs

1. Write a C# Program for simple Arithmetic operations.
2. Write a C# program to print * in Triangle form.
3. Write a C# program for squeezing an Array.
4. Write a C# program for Structures.
5. Write a C# program for Interface.
6. Write a C# program for finding Nth Biggest Element from an array.
7. Write a C# program for Parameter Passing Methods.
8. Write a C# program for finding the sum of alternate elements in the array.

Oops

9. Write a C# program for the implementation of Class and Object.
10. Write a C# program for Operator Overloading process.
11. Write a C# program for Function Overloading Process.
12. Write a C# program for Function Overloading Problem.
13. Write a C# program to find the area and volume using Inheritance.
14. Write a C# program for Delegates.
15. Write a C# program for Properties.

Windows Applications

16. Write a C# program for Simple Window Application.
17. Write a C# program using Check Box & Combo .
18. Write a C# program using Radio Button.
19. Write a C# program for Billing Process.
20. Write a C# program using Menus.
21. Write a C# program using Context Menus.
22. Write a C# program for implementation of progress bar and Track bar.
23. Write a C# program for Font and Color Dialog box.
24. Write a C# program for User defined modal and modeless dialog box.

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Course	: BCA	Code. No	:
Semester	: III /IV	No. of. Hours	: 2 hrs/ week
Paper	: NME	Credits	: 2
Title of the Paper	: PRINCIPLES OF COMPUTERS		

Course Objective:

- ❖ To get the Basic idea about the Computers .
- ❖ To understand about basic programming concepts.

Unit I **15hrs**

Computers -An overview:

Introduction to Computers - Generation of computers - Classification.

Anatomy of Digital Computer:

Anatomy of Digital Computer

Memory Units & Input Devices:

Memory Units – Input devices

Unit II **15hrs**

Output Devices and Software:

Output Devices - Introduction to Computer Softwares .

Operating Systems and Languages:

About Operating systems -Programming Languages.

Text Book:

Introduction to Computers, Alexi's Leon & Mathews Leon, Galgotia Publications, 1999.

Chapters:

Unit I : 1-4, 8, 10.

Unit II : 11, 12, 13, 15.

Reference book:

Fundamentals of computers by S. Balamurugan, PHI Publication, (2005)

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Course	: BCA	Code. No	:
Semester	: III/ IV	No. of. Hours	: 2 hrs/ week
Paper	: NME	Credits	: 2
Title of the Paper	: FUNDAMENTALS OF INTERNET		

Course Objective:

- ❖ To know about the fundaments of internet.
- ❖ To become familiar with the network basics.

Unit I

15hrs

Computers -An overview:

Introduction to Computers-Generation of computers-Classification.

Internet and Email:

Introduction-Internet Basics-Protocol-HTML web Browsers - Mailing Basics-Advantage and Disadvantages.

Unit II

15hrs

Intranet and Multimedia:

Characteristics-Intranet-Basics of Intranet- Benefits of Intranet-Extranet-Intranet Vs Client Server System.

Business on the Internet:

Introduction-catalog-Web advertising-secure transactions.

Text Book:

Introduction to Computers by Alexi's leon & Mathews Leon, , Galgotia Publications,1999.

Chapters:

Unit I :1-6

Unit II :7,8,15

Reference book

Internet complete reference by Margaret Levineyoung (2001 edition), Tata McGraw Hill Pulication.

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Course	: II BCA	Code.No	: ESM41
Semester	: IV	No. of. Hours	: 5 hrs/ week
Paper	: Elective	Credits	: 4
Title of the Paper :	MULTIMEDIA LAB		

Flash Practical Exercises

1. Animation Using Motion Tween.
2. Animation Using Shape Tween.
3. Animation Using Guide Layer.
4. Animation of Text in Multiple Layers.
5. Masking the Text by an Object.
6. Animation Using images and its effects.
7. Masking Two Images.
8. Text Morphing.
9. Importing sound
10. Animation Using Movie clip objects.

Photoshop Practical Exercises

1. Using various selection tools
2. Using image adjustment tools to enhance an image
3. Create scenery using Photoshop brushes.
4. Demonstrate the use of layer effects.
5. Create a text with picture inside.
6. Demonstrate the use of ripple effect and lens flare.
7. Create a snapshot inside a photo.
8. Photo retouching.
9. Coloring a BW photo.
10. Create slide mount template.
11. Create Photo mount template.
12. Create photo frame effect.
13. Create photo film effect.
14. Create a 3D Photo effect.
15. Create 2D and 3D logos.
16. Animate text using Image Ready.
17. Create three frames with Lens flare effect and different background colors and animate using Image Ready
18. Create a Christmas Tree with Blinking Lights.
19. Animate a candle flame using Liquefy filter.

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Course : II BCA Code. No :
Semester : IV No. of. Hours : 5 hrs/ week
Paper : Elective Credits : 4
Title of the Paper : **Mobile Computing**

Unit I 12hrs

WIRELESS COMMUNICATION FUNDAMENTALS:-Introduction – Wireless transmission – Frequencies for radio transmission – Signals – Antennas – Signal Propagation – Multiplexing – Modulations – Spread spectrum –MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks.

Unit II 12 Hrs

TELECOMMUNICATION NETWORKS :- Telecommunication systems – GSM – GPRS – DECT – UMTS – IMT-2000 – Satellite Networks - Basics – Parameters and Configurations – Capacity Allocation – FAMA and DAMA – Broadcast Systems – DAB - DVB.

Unit III 12 Hrs

WIRELESS LAN: - Wireless LAN – IEEE 802.11 - Architecture – services – MAC – Physical layer – IEEE802.11a-802.11bstandards–HIPERLAN–BlueTooth.

Unit IV 12 hrs

MOBILE NETWORK LAYER: - Mobile IP – Dynamic Host Configuration Protocol - Routing – DSDV –DSR–AlternativeMetrics.

Unit V 12 hrs

TRANSPORT AND APPLICATION LAYERS: - Traditional TCP – Classical TCP improvements – WAP,WAP2.0.

Text Books:

- 1 .Jochen Schiller, “Mobile Communications”, PHI/Pearson Education, Second Edition, 2003.
2. William Stallings, “Wireless Communications and Networks”, PHI/Pearson Education, 2002.

Unit Section

Unit I : Ch1,2 &3(From Book 1),Ch 7,10(From Book 2)
Unit II : Ch.4,5&6(From Book 1),Ch 9 (From Book 2)
Unit III : Ch 7 (From Book 1),
Unit IV : Ch 8. (From Book 1),
Unit V : Ch 9, 10 (From Book 1),

Reference Book:

Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, PHI/Pearson Education 2003.

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Course	: II BCA	Code No	:
Semester	: IV	No. of. Hours	: 5 hrs/ week
Paper	: Elective	Credits	: 4
Title of the Paper	: COMPILER DESIGN		

Course Objective:

To get the detailed ideas about the process of Compiler.

Unit I **14 Hrs**

Introduction to Compilers:
 Compilers and Translators-Structure of a compiler-programming languages.

Unit II **15 Hrs**

Parse Tree:
 Finite Automata & Lexical Analysis-Minimizing the number of states of DFA. Syntactic specification of programming languages-Context-free grammar. Derivations and parse Trees-Capabilities of Context-free grammar.

Unit III **17 Hrs**

Parse Tree & Symbol Tables:
 Parse Tree-Basic parsing Techniques-Automatic construction of Parser-LR,SLR Parsers.

Unit IV **15Hrs**

Symbol tables & Error Detection:
 Symbol tables-Content -Data structures –Errors-Lexical, Syntactic, Semantic errors.

Unit V **14 Hrs**

Code Optimization:
 Principal of sources of optimization-loop optimization-DAG representation of
 Basic Blocks-Code Generation -Problems of Code Generation.

Text Book:

Alfred V. AHO , Principles of Compiler Design,Narosa Publishing, 2003

Chapters:

- Unit I :1-2
- Unit II :3.1-3.6 to 4
- Unit III :5-6.4
- Unit IV :9,11
- Unit v :12.1-12.3,15.1,15.2

Reference:

Y.N.Srikant,Compler Design Handbook,CRC press,1995.

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Course : II BCA Code.No :
Semester : IV No. of. Hours : 5 hrs/
week
Paper : Elective Credits : 4
Title of the Paper : **SYSTEM SOFTWARE**

Course Objective:

To understand about assemblers, loaders, linkers, macros and compilers

Unit I: 10 hrs

Introduction to system software and machine Architecture – Simplified instructional Computer – Tradition machines – RISC Machines.

Assemblers:

Basic assembler functions, machine – dependent are machine independent assembler features – Assembler desired options – Implementation Examples.

Unit II: 12 hrs

Loader and Linkers: Basic loader functions – machine dependent and machine independent loader features – Loader design options – Implementations Examples.

Unit III: 12 hrs

Macro Processors: Basic Macro Processor Functions – machine – Independent Macro Processor Features – Macro Processor Design Option Implementation Examples.

Unit IV: 16 hrs

Compilers: Basic Compiler Functions – Machine – Dependent Compiler Features – Machine – Independent Compiler Features – Compiler Design Options – Implementation Examples.

Unit V: 10 hrs

Other System Software : Database Management Systems – Text Editors – Interactive Debugging Systems.

Text Book:

An Introduction to Systems Programming by Leland L. Beck, System Software Addison – Wesley (Third Edition – 2001)

Chapters:

Unit I Ch. 1,2
Unit II Ch. 3
Unit III Ch. 4
Unit IV Ch 5
Unit V Ch. 7

Reference Book:

An Introduction to System Software by Damhere, Tata Mcgraw Hill, 1997

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Course	: BCA	Code No	:
Semester	: II/IV/VI	No. of. Hours	: 2hrs/ week
Paper	: SKILL BASED ELLECTIVE	Credits	: 2
Title of the Paper	: DIGITAL DESIGN LAB		

Combinational Logic Circuits:

Digital Logic Gates
Logic Building Blocks
Boolean Equation
De Morgan’s Theory,
Binary Half adder and Full adder
Binary Half subtracter and Full subtracter.

Sequential Logic Circuits:

—
RS & RS Filpflops.

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Course	: BCA	Code No	:
Semester	: II/IV/VI	No. of. Hours	: 2hrs/ week
Paper	: SKILL BASED ELLECTIVE	Credits	: 2
Title of the Paper :	PC SOFTWARE LAB		

Excel:

1. To find Mean and Median.
2. Tax Calculation.
3. Prepare a Excel sheet for Sales analysis.
4. Prepare a Excel sheet for Cricket Scores for two teams, and display the output using Line Chart.
5. Prepare a Sales budget for a first Quarter.
6. Prepare a Excel sheet for Foreign Money Exchange
7. Personal data for Staff Members, Short out the name in Alphabetical Order.
8. Programs using Excel Pivot Table
9. Programs using Excel Data Base
10. Programs using Excel Macros.

Word:

11. Program using Formatting Toolbar
12. Program using Table
13. Program using Mail merge & Templates
14. Program using graphics& l wizards.

Power point

15. Program using slide show

Access

15. Program to create a database file (Relationship)
16. Program using query.
17. program to create forms and reports.

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Course : BCA Code No :
Semester : II/IV/VI No. of. Hours : 2 hrs / week
Paper : SKILL BASED ELLECTIVE Credits : 2
Title of the Paper : **Mathematical aptitude and Self development.**

Course objective:

- To train the students for entrance examinations.
- Self development of the students.

Unit I

Numbers – HCF & LCM – Average – Problems on Ages – Percentage – Profit and Loss

Unit II

Self esteem – Self Improvement – Developing Positive Attitude – Communication channels – Self motivation – Self Management.

Text books

1. Quantitative aptitude by Dr. R.S. Aggarwal (Fully solved) – Revised edition (Reprinted in 2011)
Publisher: S. Chand & company, New Delhi.
2. Personality Development (India edition) – Year 2006 – Reprinted in 2008
Author: Wallace – Masters
Publisher: South-Western cenagage learning.
(Acc. No. 84997) (Position S.7, P8)

Chapters

Unit I (from text book 1): Chapters 1, 2, 6, 8, 10 and 11.

Unit II (from text book 2): Chapters 1 to 4, 10, 11.

Reference book:

Business communication by Urmila Rai (2009), Tata McGraw Hill publication.

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Course : BCA Code.No :
Semester : II/IV/VI No. of. Hours : 2 hrs / week
Paper : SKILL BASED ELLECTIVE Credits : 2
Title of the Paper : **Mathematical aptitude and Interview skills**

Course objective:

To train the students for entrance examinations and campus interviews.

Unit I

15 Hrs

Ratio and proportion – Time and work – Pipes and Cisterns – Time and Distance – Alligation or Mixture.

Unit II

15 Hrs

Job Applications – Curriculum Vitae – Group Discussion – Interview.

Text books

- 1) Quantitative aptitude by Dr. R.S. Aggarwal (Fully solved) – Revised edition (Reprinted in 2011)
Publisher: S. Chand & company, New Delhi.
- 2) Resume’s and Interviews – The art of winning
Author: M. Ashraf Rizvi.
Publisher: Tata McGraw Hill, 2006.
(Acc. No. 83388) (Position T.57 P8)
- 3) How to prepare for Group Discussion & Interview
Author: H.M. Prasad.
Publisher: Tata McGraw Hill, 2006.
(Acc. No. 45464) (Position J.3,98 P1)

Chapters

Unit I (from text book 1) : Chapters 12, 15, 16, 17and 20.

Unit II (from text book 2) : Chapters 4 & 6.

(from text book 3) : Chapter 1 (from pages 3 to 17), Chapter 2 (from pages 119 to 131).

Reference book

Mathematical Aptitude by Abjith Guha (2005), Tata McGraw Hill Publication.

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Course	: BCA	Code.No	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs/ week
Paper	: SKILL BASED ELLECTIVE	Credits	: 2
Title of the Paper	: E - Commerce		

Course Objective:

To become familiar with the basics of E-commerce

Unit I

15hrs

E-Commerce over view:

E- Commerce services-Types of E-Com solutions-Major projects in Electronic communications-E-Com payment-Applications of E-Com.

Basics of E-Com:

Introduction-other Payment methods-Basics of Ecom- Ecom Technology.

Unit II

15hrs

Security Issues & ERP :

Security Issues & E- payment system- ERP- An introduction.

Text Book:

E-Commerce by S.Jaiswal, Publisher: Galgotial publications.(II Edition, 2003)

Chapters:

Unit I :1,2,2A,9A

Unit IV :13,14

Reference book:

Ecommerce by David Whiteley, TataMcGraw-Hill ,3rd Edition - 2000

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Course : BCA Code.No :
Semester : II/IV/VI No. of. Hours : 2 hrs/ week
Paper : SKILL BASED ELLECTIVE Credits : 2
Title of the Paper : **Data Mining**

Course Objective:

- To become familiar with architecture of data mining process
- To understand the implementation & application of data mining.

Unit I

15hrs

Data Mining:

Data Mining introduction- Functionalities-classification of Data Mining System-Major issues in Data Mining

Data WareHouse and OLAP for Data Mining:

DataWareHouse-Multidimensional data model-Data WareHouse Architecture-Implementation-From data warehouse to Data Mining

Unit II

15hrs

Mining complex types of data:

Multidimensional analysis and descriptive mining of complex data objects.

Application and trends in Data Mining:

Data Mining Application-Data Mining system products and research prototypes-Additional themes on Data Mining-social impacts of Data Mining-trends in Data Mining

Text Book:

Data Mining concepts and techniques by Jiawei han & Kamber (2004), Morgan kaufmann publishers.

Chapters:

Unit I :1,2.1 to 2.4,2.6

Unit II :9,10

Reference book:

Data Mining and warehousing structures by Abraham (2nd edition) (2004), PHI publication.

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(From 2014 – 2017 batch onwards)

Course	: BCA	Code.No	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs/ week
Paper	: SKILL BASED ELLECTIVE	Credits	: 2
Title of the Paper : Tally Practicals			

1. Maintaining accounts with inventory.
2. Create a Company with address,income tax no, etc.
3. Problems in stock entry
4. Purchase Order using debit note
5. Sales order
6. Receipts
7. Viewing the reports

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Course	: BCA	Code.No	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs/ week
Paper	: SKILL BASED ELLECTIVE	Credits	: 2
Title of the Paper	: Oracle		

Course Objective:

- To become familiar with the basics of oracle concepts.
- To get idea about pl/sql programming.

Unit I

15hrs

SQL:

Basic of Object-relational database-sql & sql *plus-Data types- functions-playing numbers-date, conversion, group functions.

Unit II

15hrs

PL/SQL:

Introduction-Trigger-Procedures , functions-Packages.

Text Book:

Oracle 9i complete reference by Kevin loney, Tata mcGrawHill, 2003.

Chapters:

Unit I :4,6,7,8,9,10,11

Unit IV :27,28,29

Reference Books:

Creating a self-tuning oracle database by Donald k. Burluson, Rampant Tec. Press (2004).

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(From 2014 – 2017 batch onwards)

Course : III BCA Code.No :
Semester : V No. of. Hours : 2 hrs / week
Paper : Self Study Paper Credits : 2
Title of the Paper : **Computers and Internet Applications**

Course Objective:

- To get basic idea about computers.
- To understand about basic programming concepts.
- To understand concepts of Web Applications and Internet.

Unit I:

Computers- An Overview: Introduction to computers- Generation of Computers- Classification of Computers. Anatomy of Digital Computer: Anatomy of Digital Computer.

Unit II:

Memory and Input Devices- Memory Unit- Input Devices- Output Devices- Introduction to Computer Software's- Types of Computer Software's- Operating System and Languages: About Operating System- Programming Languages- Types.

Unit III:

Internet and E-mail: Introduction-Internet Basics- Protocol- HTML Web Browsers- Mailing Basics- Advantages and Disadvantages.

Unit IV:

Intranet and Multimedia: Characteristics- Intranet – Basics of Intranet- Benefits of Intranet.

Unit V:

Business on Internet: Introduction- Web Advertising- Secure Transaction

Text Book:

Alexi's leon and Mathews leon, Introductions to Computers, Galgotia Publications.2001

Unit I –chapters 1,2

Unit II –chapters 3,4

Unit III –chapters 5,6

Unit IV –chapters 7,8

Unit V –chapters 15

Reference Books:

- 1.HTML Black Book, Steven Holzner, Paraglyph Press,2001.
2. Steven Holzaer XHTML Blackbook(Dream Tech Press) 2001.

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DEPARTMENT OF MATHEMATICS
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COURSE STRUCTURE (w.e.f 2014-2017batch onwards)

Semester -I

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Part I Tamil	P111	Ikkala Ilakkiyam	5	2	75	25	75	100
Part II English	P211	English Through Prose	4	2	60	25	75	100
Allied	SAI11	Discrete Mathematics	5	4	75	25	75	100
Core	SMI11	Programming in C	4	4	60	25	75	100
Core	SMI12	Introduction to Information Technology	4	4	60	25	75	100
LAB	SMIL11	C Lab	4	3	60	40	60	100
Value Education I	VE I	Value Education I	2	2	30	15	35	50
Environmental Studies	ES	Environmental Studies	2	2	30	15	35	50
Total			30	23				

Semester -II

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Part I Tamil	P111	Bakthi Ilakkiyamum Sitirilakkiyamum	5	2	75	25	75	100
Part II English	P211	English Through Drama	4	2	60	25	75	100
Allied	SAI21	Resource Management and Techniques	5	4	75	25	75	100
Core	SMI21	Data Structures With C++	4	4	60	25	75	100
Core	SMI22	Digital Principles and Applications	5	5	75	25	75	100
LAB	SMIL21	Data Structures with C++ Lab	5	4	75	40	60	100
Skill Based Elective I	SESIL 21	Skill Based Elective**	2	2	30	15	35	50
Total			30	23				

Semester –III

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Allied	SAI31	Numerical Methods	5	4	75	25	75	100
Core	SMI31	Computer Organization	4	3	60	25	75	100
Core	SMI32	Java Programming	4	4	60	25	75	100
Core	SMIL31	Visual Basic lab	4	2	60	40	60	100
LAB	SMIL32	Core Java Lab	4	2	60	40	60	100
Core Elective1	SEMI31	Elective*	5	3	75	25	75	100
Value Education II	VE	Value Education II	2	2	30	15	35	50
Non Major Elective	SENI31	Principles Of Computers	2	2	30	15	35	50
Total			30	22				

Semester –IV

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Allied	SAI41	Management Accounting	5	4	75	25	75	100
Core	SMI41	Relational Database Management System	4	3	60	25	75	100
Core	SMI42	Data Structures and Algorithms	4	4	60	25	75	100
Core	SMI43	Fundamentals of Microprocessor	4	4	60	25	75	100
Core	SMIL41	RDBMS lab	4	2	60	25	75	100
LAB	PJ 1	Mini Project	5	3	75	40	60	100
Skill Based Elective II	SESM41	Skill Based Elective**	2	2	30	15	35	50
Non Major Elective II	SEN41	Fundamentals Of Internet	2	2	30	15	35	50
Total			30	24				

Semester –V

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Core	SMI51	Computer Networks	4	4	60	25	75	100
Core	SMI52	Software Engineering	4	3	60	25	75	100
Core	SMI53	Operating System	4	4	60	25	75	100
Core	SMI54	Advanced Java Programming	5	4	75	25	75	100
LAB	SMIL51	Advanced Java lab	4	2	60	40	60	100
LAB	SMIL52	DTP lab	2	2	30	40	60	100
Elective-II	SEMI51	Elective -2	5	3	75	15	35	50
Value Education III	VE	Value Education III	2	2	30	15	35	50
Self Study Paper		Computers and Internet Applications*	-	-	-	-		100
Total			30	24				

* Carries Extra 5 Credits that do not form part mandatory credits (140) required for completion of the course

Semester –VI

Course	Code No	Subject	Contact Hrs/ Week	Credits	Total No of Hrs Allotted	Max Marks CA	Max Marks SE	Total
Core	SMI61	System Software	5	4	75	25	75	100
Core	SMI62	C# and .Net Technologies	5	4	75	25	75	100
Core	SMI63	Multimedia Technologies	4	4	60	25	75	100
Core	SMI64	Computer in Business Applications	5	3	75	25	75	100
LAB	SMIL61	.Net Lab	4	2	60	40	60	100
LAB	PJ1	Major Project	5	4	75	40	60	100
Skill Based Elective III	SESI61	Skill Based Elective**	2	2	30	15	35	50
Total			30	23				
Part V				1				

LIST OF NON-MAJOR ELECTIVE PAPERS (2 HOURS/WEEK)

- 1) PRINCIPLES OF COMPUTERS
- 2) FUNDAMENTALS OF INTERNET

***-LIST OF ELECTIVE PAPERS (5 HOURS/WEEK)**

(One elective paper to be chosen in III & V semester)

- 1) CLIENT/SERVER TECHNOLOGY
- 2) MOBILE COMPUTING
- 3) WEB PROGRAMMING
- 4) COMPILER DESIGN

**** -LIST OF SKILL BASED ELECTIVES (2 HOURS/WEEK)**

(One elective paper to be chosen in II,IV,VI semester)

- 1) DIGITAL DESIGN LAB
- 2) MS-OFFICE LAB
- 3) VISUAL BASIC THEORY
- 4) WEB DESIGNING LAB
- 5) CRYPTOGRAPHY
- 6) OBJECT ORIENTED ANALYSIS & DESIGN
- 7) SECURITY IN COMPUTING
- 8) STRUCTURED SYSTEM ANALYSIS & DESIGN

A) CONSOLIDATION OF CONTACT HOURS AND CREDITS: UG

Semester	Contact Hrs/ Week	Credits
I	30 hrs.	23
II	30 hrs.	23
III	30 hrs.	22
IV	30 hrs.	24
V	30 hrs.	24
VI	30 hrs.	23
Part – V	--	1
Total	180 hrs	140

B) Curriculum Credits: Part wise

Part I	Tamil	2x2 = 04 Credits
Part II	English	2x2 = 04 Credits
Part III	Core	= 91 Credits
	Allied	4x4 = 16 Credits
	Core Electives	2x3 = 06 Credits
Part IV	Value Education	3x2 = 06 Credits
	Environmental studies	1x2 = 02 Credits
	Skill Based Electives	3x2 = 06 Credits
	Non – Major Electives	2x2 = 04 Credits
Part V		1x1 – 01 Credits
	Total	140 Credits

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From 2014-2017batch onwards

Course	: I B.Sc (IT)	Code. No	: SAI11
Semester	: I	No. of. Hours	: 5 hrs/ week
Paper	: Allied(1)	Credits	: 4
Title of the Paper	: Discrete Mathematics		

Course objective:

- ❖ Introducing fundamental concepts of mathematics which are essential for computer science students.

Unit I: Logic **14 hrs**

Introduction – IF statement – connectives – Atomic and Compound Statements – Well Formed Formula – Truth Tables – Tautology & Contradiction. Tautological Implications and Equivalence Formula – Replacement Process – Functionally complete sets and duality law.

Unit II: Normal Forms **12 hrs**

Normal forms – Principal of Normal Forms – Theory of Inference

Unit III: Matrix Algebra **12hrs**

Introduction – Matrix Operations – Inverse of a Square Matrix – Elementary Operations and Rank of a Matrix – Simultaneous Linear Equations – Inverse by Partitioning – Eigen Values and Eigen Vector (Proofs of the theorems or not included – problems only)

Unit IV: Graph Theory **10 hrs**

Basic Concepts – Matrix Representation of Graphs (Proofs of the theorems or not included)

Unit V: Automata theory **12 hrs**

Introduction – Finite Automaton- Definition of Finite Automaton – Representation of Finite Automaton – Acceptability of a String by a Finite Automaton – Languages Accepted by a Finite Automaton - Nondeterministic Finite Automaton(NFA) –Acceptability of a String by an NFA.

Text Book:

Discrete Mathematics by Dr. M. K. Venkataraman, Dr. N. Sridharan and N. Chandrasekaran
Publisher: The National Publishing Company (2000 edition – Reprinted in May 2009)

Unit I Chapter IX : Sections 1-10

Unit II Chapter IX : Sections 11, 12, 13

Unit III Chapter VI : Sections 1 - 7

Unit IV Chapter XI : Sections 1, 2

Unit V Chapter XII : Sections 1-8

Reference Books:

1) Introduction to Discrete Mathematics – M.K.Sen and B.C. Chakraborty (Reprinted in 2010) Publisher: Books and Allied (P) Ltd. Company.

2) Discrete Mathematics with Graph theory and combinatrics by T. Veerarajan (Tenth reprint in 2010) Publisher : Tata McGraw Hill education (P) Ltd. Company.

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From 2014-2017batch onwards

Course	: I BSc IT	Code No	: SMI11
Semester	: I	No. of. Hours	: 4 hrs / week
Paper	: Core-I	Credits	: 4
Title of the Paper	: Programming in C		

Course objective :

- To understand and apply advanced programming concepts.
- To understand the concept like pointers, structure, files and link list

Unit I: Introduction and C Fundamentals **12 hrs**

Introduction to C- The C Character set – Identifiers and Keywords – Data types – Constants – Variables- Declaration – Expressions – Various Type of Operators.

Data Input, Output and Control Statements:

Preliminaries – Reading & Writing a Character – Formatted Input / Output data – The gets and puts functions- Decision Making and Looping (While & Do) – Nested For looping – Switch – Break -Continue – Go to

Unit II: Arrays & Strings **12 hrs**

Array-Introduction – One dimensional array – two dimensional array - multi dimensional arrays – handling of character strings – declaring, reading strings – arithmetic operation on characters – string handling functions.

Unit III: Functions **12 hrs**

Function - Introduction - Form of C Functions – Returns Values and Types – Calling a Functions – Category of functions with, without arguments – handling of non integer functions – Nesting of functions - Recursion – function with arrays - library function – macros – the C Preprocessor – Bit level programming.

Unit – IV: Structures & Pointers **16 hrs**

Structure-Introduction – Structure definition – giving values to members – structure initialization – Comparison of structure variables – Arrays of structures – Array with in structures – structures within structures – structures and functions – Union – Size of structures – Bit fields – pointer introduction - understanding pointers – declaring and initializing pointers – Pointers and arrays – pointers and character strings – pointer and functions – pointers and structures.

Unit V: File Management **8 hrs**

File Management: Introduction – defining and opening a file – closing a file – input output operations and file – error handling during i/o operation – random access to file – files – Dynamic memory allocation and link list.

Text Book: E. Balagurusamy , Programming in C, Second Edition, Tata McGraw – Hill Publishing Company Limited, New Delhi-Second Reprint 1993.

Unit I	Ch1-6
Unit II	Ch. 7,8
Unit III	Ch 9
Unit IV	Ch10,11
Unit V	Ch 12,13

Reference Books:

1. Byron S. Gottfried, Programming with C, Tata McGraw – Hill Publications.2001
2. Yashwant Kanetkar, Understanding Pointers in C, BPB Publications, Delhi 1995

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From 2014-2017batch onwards

Course	: B.Sc. IT	Code No	: SMI22
Semester	: I	No. of. Hours	: 4 hrs / week
Paper	: Core 2	Credits	: 4
Title of the Paper	: Introduction to Information Technology		

Course Objective:

The purpose of the paper is to provide introduction about Information Technology.

Unit – I: 12 Hrs

Introduction to computers- computer architecture- number system – memory units- auxiliary storage devices-input devices-output devices.

Unit – II: 12 Hrs

Introduction to computer software – operating systems – programming languages- general software features and trends

Unit III: 12 Hrs

Introduction to database management systems — computer networks

Unit IV: 12 Hrs

Internet and World Wide Web – e- mail- intranet – extranet – introduction to multimedia- data warehouse and data marts – data mining

Unit V: 12 Hrs

Computers in business industry – computers in home –computers in education and training – computers in entertainment , science, medicine and engineering.

Text Book:

Fundamentals of Information Technolgy, Alexis Leon & Mathew Leon, Leon Tech World Edition 2002.

UNIT	SECTION
I	1.1 -1.6
II	2.1 -2.5
III	3.1 -3.5
IV	4.1-4.6
V	5.1-5.4

Reference Book:

Fundamentals of computers Rajaram PHI publisher III Edition 2001

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From 2014-2017batch onwards

Course	: I B.Sc. IT	Code No	: SMIL11
Semester	: I	No. of. Hours	: 4 hrs / week
Paper	: Core-3	Credits	: 3
Title of the Paper	: C lab		

1. Standard Deviation.
2. Prime Number
3. Adam Number.
4. Armstrong Number.
5. Perfect Number.
6. PASCAL's Triangle
7. Multiplying two matrices & transpose of the matrix.
8. Linear search & Binary search.
9. Sum of Digit.
10. Reverse the Digit.
11. Binary to decimal...etc.
12. Sin series, Cos Series.
13. Quadratic Equation using switch.
14. Magic Square
15. Team wise Player Display – Structures & Files.
16. Stack, Queue Implementation using array.
17. String manipulation using Pointers & Arrays.
18. Library System using Data files – Structure
19. Inventory system using Data files – Structure.
20. Banking system using Data files, Structure.
21. Students Marks Processing, Structure.
22. Employee Salary Bill Processing, Structure.
23. Counting the No. of Words, characters, Spaces, Lines Alphabetsin Text files.

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From 2014-2017batch onwards

Course : I B.Sc (IT) Code No : SAI21
Semester : II No. of. Hours : 5 hrs/
week
Paper : Allied (2) Credits : 4
Title of the Paper : **Resource Management Techniques**

Course objective:

- ❖ To introduce the fundamental concepts of operations research.
- ❖ To train the students in solving managerial and other real time problems.

Unit-I **12 hrs**

Operations Research an overview – Origin and development of OR – Applications of OR – Opportunities and short comings of OR - Linear Programming Problem – Mathematical Formulation – Graphical Solution.

Unit-II **16 hrs**

General LPP – Canonical and Standard Forms of LPP – Insights into the simplex Method – Introduction for simplex method - Fundamental properties of solutions (problems only) – The Computational Procedure – Use of Artificial Variables (Problems only).

Unit-III **17 hrs**

Duality in linear programming problem – Introduction – General primal-dual Pair - Formulating a dual Problem – Primal dual pair in matrix form – Duality and simplex method - Dual simplex method (Problems only).

Unit-IV **18 hrs**

Transportation Problem – Introduction – General transportation Problem – The Transportation Table – Loops in transportation table – Triangular basis - Solution of transportation problem – Finding an initial basic feasible Solution – Test for optimality – Economic interpretation - Degeneracy in transportation problem – Transportation algorithm (MODI Method) – Some exceptional cases.

Unit-V **12 hrs**

Assignment problem – Introduction – Mathematical formulation of the Assignment problem – Solution methods of assignment problem – Special cases in Assignment Problems.

Text Book:

Operations Research by Kanti Swarup, P.K.Gupta, Man mohan - Thirteenth Thoroughly Revised Edition (Reprinted in 2008) - Publisher: Sultan Chand & Sons company.

UNIT	SECTION
I	Chapter 1 : 1.1, 1.2,1.10 and 1.11 and Chapter 2. Chapter 3 : 3.1 to 3.3.
II	Chapter 3 : 3.4 to 3.6 Chapter 4 : 4.1 to 4.4
III	Chapter 5 : 5.1 to 5.4 , 5.7 ,5.9
IV	Chapter 10:10.1, 10.2, 10.5 to 10.13 and 10.15
V	Chapter 11: 11 .1 to 11.4

Reference Books:

- 1) Operations Research – Theory and application by J. K. Sharma (fourth edition – Reprinted in 2010) – Publisher: Macmillan publishing company.
- 2) Introduction to Operations Research – A computer oriented algorithmic approach by Billy E. Gillett (eighth reprint in 1989) – Publisher: Tata McGraw Hill publishing company (p) Ltd company.

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DEPARTMENT OF MATHEMATICS
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From 2014-2017batch onwards

Course	: I B.Sc. IT	Code No	: SMI21
Semester	: II	No. of. Hours	: 4 hrs / week
Paper	: Core-4	Credits	: 4
Title of the Paper	: Data StructuresWith C++		

Course objective :

- To understand the concepts like data abstraction, inheritance & polymorphism
- To become familiar with the features of object oriented programming

Unit I: **18 hrs**

Software Crisis – Software Evolution – Basic Concepts of Object – Oriented Programming – Benefits of OOP – Object Oriented Languages – Applications of OOP – Application of C++ - More C++ statements – Structure of C++ program – Creating the source file Compiling and Linking Tokens – Keywords – Identifiers – Basic Data Types – User Defined Data Types – Derived Data Types – Symbolic Constants – Types Compatibility – Declaration of Variables – Dynamic Initialization of Variables – Reference Variables – Operators in C++ - Manipulators – Type Cast Operator – Expressions and Implicit Conversions – Operator Overloading – Control Structures – The Main Function – Function Prototyping – Inline Functions – Function overloading – Friend and Virtual functions.

Unit II: **10 hrs**

Specifying a class – Defining Member functions – Marking an outside function Inline – Nesting of Member functions – Private member functions – Arrays within a Class – memory Allocation for objects Static Data Members – Static member function arrays of objects – objects as function arguments – friendly functions – returning objects consent member functions pointers to members – constructors in a class – constructors with default arguments – dynamic initialization of objects – copy constructor – constructing two dimensional arrays – Destructors.

Unit III: **12 hrs**

Defining Operator Overloading – Overloading unary operators – overloading Binary Operators – Overloading Binary operators – overloading binary operators using friends – manipulation of strings using operators - rules for overloading operators – type conversions – Defining derive ed classes single inheritance – multilevel inheritance – multiple inheritance. Hierarchical inheritance – virtual base classes – constructors in derived classes – member classes: Nesting of classes.

Unit IV: **10 hrs**

Pointer to objects – this pointer – pointers to derived classes – virtual functions – pure virtual function C++ stream classes – unformatted I, O operations – managing output with manipulators. Classes of file stream operations – opening and closing a file – detecting end of file – more about open (); File modes file pointers and their manipulation – sequential input and output operations – updating a file; Random access – Error handing during file operations – command line arguments.

Unit V: **10 hrs**

Stack : Operation on as array-Stack as an array-Stack as a Linked list-Applications of stack- Conversions of Infix impression to postfix expression-evaluation of a postfix expression- Recursion-Maze. Queue : Operation on Queues-Queue as an array-Oueue as linked list-Doubly linked list-Circularly linked list. Applications of linked lists-Linked list versus array-Doubly linked versus singly linked.

Text Books:

- 1) E. Balagurusamy OBJECT ORIENTED PROGRAMMING WITH C++, Tata McGraw – Hill publishing scompany Limited. 1998.
- 2) Data Structures and algorithms using C++, L.Mathu Krithiga Venkatesh

Chapters: 1 to 11

Reference Books :

- 1) Herbest schild ,C++ The complete Reference , TMH, 1998.
- 2) Yashwant kanetkar, Let us C++, BPB Publications, 1995

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Course : I B.Sc. IT Code No. : SMI12
Semester : II No. of. Hours : 5 hrs/ week
Paper : Core-5 Credits : 5
Title of the Paper : **Digital Principles and Applications**

Course objective:

- To know the different techniques of digital circuit analysis.
- To understand the working of different digital circuits.

Unit I: Number representation **10 hrs**

Number systems and codes – why Binary numbers are used –Binary to decimal conversion- Decimal to Binary conversion- – Octal numbers – Hexadecimal numbers-BCD – ASCII code-Excess 3 code – Gray code – ASCII.

Unit II: Boolean algebra **10 hrs**

Logic circuits-Booleans laws and theorem – Boolean simplification K. Map: Sum of products method – Product of sums methods.

Unit III: Combinatorial Logic **10 hrs**

Data processing circuits- Multiplier, Demultiplexer, Decoder, BCD to Decimal decoders-seven segment decoders-encoders Exclusive OR gates –Parity generators checkers-ROM– PAL logics.

Unit IV: Negative numbers & Arithmetic Design **12 hrs**

Arithmetic Circuits: Binary Addition- Binary Subtraction-unsigned binary numbers-sign magnitude numbers- 2’s complement representations – 2’s complement Arithmetic –Arithmetic building blocks- half & full adder design – adder- subtractor design.

Unit V: Sequential Logic **18 hrs**

Flip –flops: RS, D, JK, - Triggering: level a edge – Registers: four shift registers – Counters: Ring counters, synchronous, asynchronous counters – Mod3 counter.

Text Book:

Morris Mano, Digital Logic & Computer Design, Prentice Hall of India, April 2005

Unit I
Unit II Ch. 7,8
Unit III Ch 9
Unit IV Ch10,11
Unit V Ch 12,13

Reference Book:

Albert Paul Malvino, Donald P.Leach, Digital Principles and Applications, Fourth Edition

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Course	: I B.Sc. IT	Code No.	: SMIL21
Semester	: II	No. of. Hours	: 5 hrs /
week			
Paper	: Core-6	Credits	: 4
Title of the Paper	: Data StructuresWith C++ Lab		

Course content :

1. Program to demonstrate all manipulators in C++
2. Swap Two values using call by value & call reference method.
3. Evaluate a expression using macros in C & inline function in C++
4. Perform stack and Queue operation using arrays and pointers.
5. Compare any two elementary data types in C++ using function overloading.
6. Find m power n values using default arguments.
7. Program to perform Simple banking operation.
8. Perform the following Complex operations using operator overloading +=, -=, *=, /=, >, <, >=, <=, !=, ==
9. Overload the redirection operation >> and << for any class.
10. Type Conversion Program.
11. Programs using multiple inheritance, hybrid inheritance, Hierarchical inheritance, multilevel inheritance
12. Program using Polymorphism and Virtual functions.
13. Text File No, of digits, Characters, Words, Lines, etc.,
14. Program to merge two data files.
15. Singly sorted linked list, Circular linked list, Doubly Linked list.
16. Random access data type.

Text Book:

OBJECT ORIENTED PROGRAMMING WITH C++ by E. Balagurusamy Tata McGraw – Hill publishing company Limited. 1998.

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From 2014-2017batch onwards

Course	: II B.Sc. (IT)	Code. No	: SAI31
Semester	: III	No. of. Hours	: 5 hrs/ week
Paper	: Allied(3)	Credits	: 4
Title of the Paper	: NUMERICAL METHODS		

Course objective :

- ❖ Introducing fundamental concepts of Numerical methods such as solving algebraic equations, interpolation, differentiation and integration.

Unit I: (Solution of an algebraic equation) 15 hrs

Bisection method – False Position method – Successive approximation method – Newton-Raphson method – Horner’s method (Problems only).

Unit II: (Solution of simultaneous linear algebraic equations) 15 hrs

Introduction - Gauss elimination method – method of triangularisation – Jacobi’s method – Gauss Seidel method – finite differences – difference table - backward differences (problems only).

Unit III: (Interpolation) 17 hrs

Introduction – Linear interpolation –Gregory-Newton forward interpolation – Gregory-Newton backward interpolation – Divided differences – Newton’s interpolation formula for unequal intervals – Lagrange’s interpolation formula – Inverse interpolation (problems only).

Unit IV: (Numerical differentiation and Integration) 14 hrs

Newton’s forward and backward difference formulae to compute the derivatives - Trapezoidal rule – Simpson’s 1/3 rule (problems only).

Unit V: (Numerical solution of ordinary differential equations) 14 hrs

Solution by Taylor series – Euler’s method – Runge -Kutta method (second and fourth orders only) – Milne’s Predictor - Corrector method (problems only).

Text Book:

Numerical Methods in Science and Engineering by Dr. M.K. Venkataraman (Fifth edition - Revised and enlarged edition – Reprinted in 2008). Publisher: The National publishing company.

Chapters:

Unit I : Chapter III - 1 to 5 and 8 (Horner’s method)
Unit II : Chapter IV - 1 to 4 and 6
Chapter V - 1 to 7.
Unit III : Chapter VI - 1 to 5
Chapter VIII - 1,3,4 and 5(Inverse interpolation)
Unit IV : Chapter IX - 1,2,3,7,8 and 10
Unit V : Chapter XI - 6, 10 to 15, 19 and 20.

Reference Books:

- 1) Applied numerical analysis by Curtis F. Gerald, Patrick O. Wheatley (2004 edi.) – Pearson publication.
- 2) Numerical methods by Dr. S. Arumugam, A. Thangapandi Isaac and A. Somasundaram (2001 edition) – Scitech publications India (P) ltd.

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Course	: B.Sc. IT	Code No.	: SMI31
Semester	: III	No. of. Hours	: 4 hrs / week
Paper	: Core-7	Credits	: 3
Title of the Paper	: COMPUTER ORGANIZATION		

Course objective :

- To become familiar with different kinds of computer organization and applications.
- To increase the understanding of basic concepts.

Unit I: **10 hrs**

Fundamentals: Functional Units – Operational Concepts – Bus Structures – Distributed Computing – Historical perspective – Addressing methods – stacks and queues – subroutines.

Unit II: **10 hrs**

Processing Unit: Fundamental concepts – Execution of a complete instruction – Hardwired control – Micro programmed control.

Unit III: **12 hrs**

I / O Organization: Accessing I / O devices – Interrupts DMA – I / O hardware.

Unit IV: **12 hrs**

Memory Management : Basic concepts – RAM – ROM – Cache Memories – Virtual memories – Memory Management requirements.

Unit V: **16 hrs**

Arithmetic and Pipelining: Fast adders – Signed addition and subtraction – Multiplication of positive numbers – Signed operand multiplication – Fast multiplication – integer division – floating point addition and subtraction – Basic concepts of Pipelining .

Text Book:

V. Carl Hamacher, Zronko G. Vranesic, Sofwat O. Zaky , Computer Organization, McGraw- Hill Publication, Fourth Edition, 1996

Unit I : 1.1 -1.3, 1.6, 1.7, 2.4-2.8

Unit II : 3.1-3.5

Unit III : 4.1, 4.2, 4.4, 4.5

Unit IV : 5.1-5.5, 5.7

Unit V : 6.1-6.10, 7.1

(Excluding Processor Examples and Performance Considerations)

Reference Book:

Morris Mano, Computer System Architecture, Third edition 2001 Hill Publication.

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From 2014-2017batch onwards

Course	: B.Sc. IT	Code No.	: SMI32
Semester	: III	No. of. Hours	: 4 hrs / week
Paper	: Core-8	Credits	: 4
Title of the Paper	: JAVA PROGRAMMING		

Course Objective:

- To understand Java application programs
- To become familiar about AWT & Applets.

Unit I: Introduction: 10 hrs

JAVA language – JAVA Revolution – Object oriented fundamentals – Java Language Introduction- Types – Operations – Flow control.

Unit II: Classes & Object: 12 hr

Classes – Object references-Instances Variable-new operator –DOT operator-Method Declaration and calling –this-instance variable hiding -Constructor- Method over loading-Inheritance-super-finalize-static-abstract. **Packages And Interfaces:** The package statement-import statement-Interface Statement –Implement Statement. **Exception Handling:** Try-Catch-Throw-Throws-Finally.

Unit III: 12 hrs

Threads and Synchronization: Java Thread model-Thread Priorities-Synchronization. **Utilities:** Simple type wrapper-Enumeration-Date, Math, Random. **String Handling:** String Creation-concatination-Conversion-Comparision-String copy modification-String Buffer-append-insert.

Unit IV: 12hrs

Input / Output : Input Stream- Output Stream- File Stream- Print Stream.

Networking :

Inet Address-Datagram’s-Socket-URL.

Unit V: 14 hrs

Applet: Syntax for applet-order of Applet initialization-Sizing graphics-Color-Fonts-Multiline Text. **Abstract window Toolkit :** Component-Checkbox, Label, Text Boxes, Button-Menu Components Event Handling

Text Book:

Patrick Naughton, “THE JAVA HAND BOOKS”, TMH 1997.

Unit I	1-6
Unit II	7,8,10
Unit III	9, 11, 12
Unit IV	13, 14
Unit V	15,16

Reference Book:

Patrick Naughton, The Complete reference Java,Osbourne Publisher, 1997

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Course	: B.Sc. IT	Code No.	: SMIL31
Semester	: III	No. of. Hours	: 4 hrs / week
Paper	: Core-9	Credits	: 2
Title of the Paper	: VISUAL BASIC LAB		

- 1.Simple Arithmetic Operations (+, -, /, *) using text Command Boxes.
- 2.Manipulation of String and Date functions.
- 3.Designing of a Calculator.
- 4.Margin Square.
- 5.Number Puzzle, Picture Puzzle.
- 6.Using file, Directory, Drive List boxes, to load a text file into a Rich Text Box.
- 7.Design a text editor using Rich Text Box.
- 8.Functions of Common dialogue box (Open, Save, color, Font, Printer & Help options)
- 9.Design a Screen Saver.
10. Animation of Picture.
11. Use list box, Combo box to change the font, font size of the given text.
12. Display a pop up menu in the form when you click the right mouse button.
13. Use Graphical functions to draw a picture and save it.
14. Database Access using DAO, RDO, ODBC.
15. Compare the scores of two cricket teams, by the using of Graphs.
16. Design a Simple game .

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Course	: B.Sc. IT	Code No.	: SMIL32
Semester	: III	No. of. Hours	: 4 hrs / week
Paper	: Core-10	Credits	: 2
Title of the Paper	: CORE JAVA LAB		

1. Arrays and Flow – Control Statements.
2. Class and object.
3. Implement a interface.
4. Runtime Exception & I/O Exception.
5. User defined exception.
6. Multithreading.
7. Layout Management.
8. GUI components (Label, Check Box, Menus, Text etc...)
9. Event Handling (Focus events, Key events, Plant events, Text events, Mouse events, Windows events, etc....)
10. Animation & Images.
11. Implementation of Applet life cycle.
12. Java File Management Methods.
13. Java Streams.
14. Design an Applet form for the implementation of simple arithmetic calculation.
15. String and vector process.
16. User defined package.

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Course	: B.Sc. IT	Code No.	: SMI41
Semester	: IV	No. of. Hours	: 4 hrs / week
Paper	: Core-11	Credits	: 3
Title of the Paper	: RELATIONAL DATABASE MANAGEMENT SYSTEM		

Objective:

The aim of this course is to enable the students to understand Relational database Management System concepts. To give hands on training in RDBMS, ORACLE package is included. Students are trained to handle complex data types using ORDBMS.

UNIT I: 12 Hrs

Introduction to DBMS – Data Models –Database languages– Basic concepts – Keys – Relational operators – ER Model. **Relational Model:** Structure of Relational Database – The Relational Algebra – Extended Relational Algebra operations – Modification of the Database – Views. **Relational Databases:** Basic Structures – Set operations – aggregate functions – Null values – Nested subqueries – Views – Complex Queries – Modification of the database - Joined relations – Data Definition Language - Embedded SQL – Dynamic SQL.

UNIT II: 12 Hrs

Integrity and Security: Domain Constraints – Referential Integrity – Assertions – Triggers.**Relational Database Design:** Functional Dependencies – Decomposition – Desirable properties of Decomposition

UNIT III: 12 Hrs

Normalization: – 1NF – 2NF - 3NF – Boyce Codd Normal form – 4NF – Other Normal forms. **Introduction to SQL:** –Basic parts of Sql-Basic of Object relational Database-Playing number-Date function –Grouping-Sub Queries-Changing Data –Creating, Altering Tables.

UNIT IV: 12 Hrs

PL/SQL – Looping Statements – Conditional Statements – Cursor – Triggers – Exception Handling – Procedure – Functions and Packages

UNIT V: 12 Hrs

Transaction Management: Transaction concepts – Transaction State – Implementation of Atomicity and Durability – Concurrent Executions – Serializability – Recoverability – Implementation of Isolation – Transaction Definition in SQL .

Concurrency Control: Lock based protocols – Timestamp-Based protocols – Validation-Based protocols – Multiple Granularity – Multisession schemes – Deadlock handling.

Text Books:

1. Abraham Silberschtz, Henry F. Korth, S.Sudershan, DATA BASE SYSTEM CONCEPTS (Fourth Edition) McG. Hill International Editions, 2002
2. Kevin Loney, George Koch, Oracle 9i The Complete Reference, Tata McGrawHill1995.

Unit I : 1.4,1.5,2.1,2.3,2.5,3.1 to 3.5, 4.1 to 4.13

Unit II : 6.1 to 6.4,7.1 to 7.5

Unit III : 7.6 to 7.9 in DBMS

3, 4, 8, 9, 11, 12, 15, 18 in Oracle 9i Complete Reference

Unit IV : 27, 28, 29 in Oracle 9i Complete Reference

Unit V : 15.1 to 15.9, 16.1 to 16.6

Reference Book:

Date C.J., An Introduction to Database Systems Vol.1, Narosha Publishing House, New Delhi, 1995.

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From 2014-2017batch onwards

Course	: B.Sc. IT	Code No.	: SMI42
Semester	: IV	No. of. Hours	: 4 hrs / week
Paper	: Core-12	Credits	: 4
Title of the Paper	: DATA STRUCTURES AND ALGORITHMS		

Course Objective:

To become familiar with different types of Data structures & their applications.
To increase the understanding of basic concepts.

UNIT I: Data Structures: 12hrs

Stacks and Queues-Trees-Terminology-Binary Trees-Dictionaries-Binary Search Trees-Cost Amortization-Priority Queues-Heaps-Heap Sort.

UNIT II: Basics of Algorithms: 12 hrs

Sets and Disjoint set union-Introduction-union and find operations-Graphs-Introduction, Definitions-Graph representations-What is an Algorithm-Algorithm specification-Performance Analysis.

UNIT III: Divide and Conquer: 12 hrs

General Method -Binary search-Finding the maximum and minimum-Merge Sort-Quick sort

UNIT IV: Greedy Method:. 12hrs

General methods-Knapsack problem-Minimum cost spanning trees-optimal storage on tapes-Optimal merge patterns-single source shortest paths.

UNIT V: Dynamic Programming: 12 hrs

General method-Multi stage graphs-All pair shortest paths-optimal binary search trees -General method-The 8 Queen Problem.

Text Book:

Computer Algorithms-Ellis Horowitz, Sartaj Sahni, Rajasekaran.-1999-Galgotia

UNIT I : 2.1, 2.2, 2.3, 2.4

UNIT II : 2.5, 2.6, 1.1, 1.2, 1.3

UNIT III : 3.1, 3.2, 3.3, 3.4, 3.5

UNIT IV : 4.1, 4.2, 4.5, 4.6, 4.7, 4.8

UNIT V : 5.1, 5.2, 5.3, 5.5, 7.1, 7.2

Excluding Derivations

Reference Book:

Seymour Lipschutz, Theory and problems of Data Structures ,Schaum’s Series, Tata Mcgraw Hill, 1986.

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Course	: B.Sc. IT	Code No.	:SMI43
Semester	: IV	No. of. Hours	: 4 hrs / week
Paper	: Core-13	Credits	: 4
Title of the Paper	: FUNDAMENTALS OF MICROPROCESSOR		

Course objective :

- To understand microprocessor architecture memory and I/O (8086 & 8088)
- Develop skill in software development using microprocessor
- To understand concept of interfacing techniques to stand computer ports and to the expansion bus.

Unit I : **12hrs**

Introduction to Micro computers – Evolution of Micro Processors – Classification of computers – General Purpose Computer – Microcomputer – Application of the Microprocessors – Microprocessor architecture and microcomputer systems.

Unit II : **12hrs**

Software Architecture of the 8086/8088 microprocessors – Microprocessor internal architecture – Software model – Data types – Segment Registers – Data Registers – Pointer and Index registers – Status registers – generating a memory address – Addressing Modes.

Unit III : **12hrs**

The 8086/8088 micro processor programming – the instructions set – data transfer instructions – Arithmetic instructions – Logic instructions – Shift instruction – Rotate instructions – Compare instructions – Jump instructions – Loop and loop handling instructions – String and string handling instructions

Unit IV. **12hrs**

8088/8086 microprocessors and their memory interfaces :- minimum mode and maximum mode systems-minimum system mode interface-maximum system mode interface-bus cycle-read and write bus cycles-i/o interface-i/o data transfer-I/O instructions.

Unit V. **12hrs**

Interrupt interface of the 8088/8086 microprocessors:- types of interrupts-interrupt address pointer table-interrupt instructions-enabling/disabling of interrupts-external hardware interrupt interface-8259A programmable interrupt controller-software interrupts-non mask able interrupt-reset-internal interrupt functions.

Text Book:

Walter A.Triebel, Avatar Singh - The 8088 and 8086 microprocessors, programming, interfacing, software and applications- -Prentice Hall of India Private Limited,1995.

Unit I	Ch1,2
Unit II	Ch. 4
Unit III	Ch 5
Unit IV	Ch 6.1-6.4,6.8,6.12,7.1-7.5,7.10,7.13
Unit V	Ch 8.1-8.6,8.8,8.10-12

Reference Book:

Adithya P.Mathur – Introduction to Microprocessors, Third Edition, Tata MgcrawHill 1992.

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Course	: B.Sc. IT	Code No.	: SMIL41
Semester	: IV	No. of. Hours	: 4 hrs / week
Paper	: Core-14	Credits	: 2
Title of the Paper	: RDBMS LAB		

SQL

1. Queries on Employ table.
2. Queries on Hospital table
3. Queries on Graduate table.
4. Queries on Simple Interest.
5. Queries on Game table.
6. Join Queries.

PL/SQL

9. Program using conditional control, Iterative controls & sequential controls.
10. Programs using exception handling.
11. Student mark list using for cursor.
12. Programs using explicit cursor & Implicit cursors.
13. Programs using PL / SQL tables and records.
14. Programs using Database Triggers.
15. Program to design procedures using In, Out, Inout parameter.
16. Program to design procedure and functions package.
17. Program to design procedures using packages.
18. Program to design procedures.

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Course	: B.Sc. IT	Code No.	: SMI51
Semester	: V	No. of. Hours	: 4 hrs / week
Paper	: Core-15	Credits	: 4
Title of the Paper	: COMPUTER NETWORKS		

Unit I: **12hrs**

Introduction: User – Hardware – Software – Reference Models – Example Network – Example data communication services – Network Example data communication services – Network Standardization.

Unit II: **12hrs**

Physical Layer: Transmission Media – Wireless Transmission – The Telephone System – Cellular radio – Communication satellites.

Unit III: **12hrs**

Data Link Layer & Medium Access Layer: D.L.L. Design Issues – Elementary Data link Protocols -Multiple Access Protocols - Ethernet, Tokens bus, Token ring standards.

Unit IV: **12hrs**

Network layer & Transport Layer: N.W.L. Design Issues – Routing algorithms – T.P.L. Design Issues – Elements of T.P.L. protocol.

Unit V: **12hrs**

Application Layer: Network security – E.Mail – Use net news – WWW. Multimedia.

Text Book:

Computer Network By Andrew S. Tanenbawm PH1, Third Edition, 1996.

Chapters:

1,2.2,2.3, 2.4, 2.7, 2.8, 3.1, 3.3, 4.2, 4.3.1, 4.3.2,

Reference Book:

Data communication and Networking Bhrouz A.Forouzan-II Edition MGH Publisher 2001.

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Course	: B.Sc. IT	Code No.	: SMI52
Semester	: V	No. of. Hours	: 4 hrs / week
Paper	: Core-16	Credits	: 3
Title of the Paper	: SOFTWARE ENGINEERING		

Course Objective:

- To become familiar with software engineering methods, procedures & tools
- To become aware of current trends and technologies in software engineering.

Unit I: **12 hrs**

Introduction to Software engineering:- Some definition – Some Size factors – Quality to Productivity Factors – Managerial issue. **Planning a Software Project:** Defining the Problem – Developing a solution Strategy – Planning the development process – planning an Organizations Structure – Other planning activities.

Unit II: **12 hrs**

Software Cost Estimation : Software Cost factors - Software cost estimation Techniques – Staffing level estimation -Estimative software maintenance costs.

Unit III: **12 hrs**

Software requirements definition : The Software requirements specification – Formal Specification Techniques - languages and processors for requirements specifications.

Unit IV: **12 hrs**

Software Design: Fundamentals Design Concepts - Modules and modularizing Criteria – Design Notations - Design Techniques – Detailed Design Consideration – Real time and distributed system design – test plan – milestones, walkthrough and Inspection – Design guide lines.

Unit V: **12 hrs**

Verification and Validation Techniques: Qualification Assurance –System Testing – **Software maintenance:** Enhancing maintainability during development – Managerial aspects of software maintenance - configuration management – source code metrics.

Text Book: Richard E. Fairly, Software engineering Concepts, 1985, McGraw – Hill book company.

Unit Chapters

Unit I : 1,2

Unit II : 3

Unit III : 4

Unit IV : 5

Unit V : 8,9

Reference Book:

Roger S. Pressman- Software Engineering: A Practical approach McGraw Hill International Books Company 1987 Edition.

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DEPARTMENT OF MATHEMATICS
BACHELOR OF INFORMATION TECHNOLOGY
From 2014-2017batch onwards

Course	: B.Sc. IT	Code No.	:SMI53
Semester	: V	No. of. Hours	: 4 hrs / week
Paper	: Core-17	Credits	: 4
Title of the Paper	: OPERATING SYSTEM		

Course Objective:

- To develop fundamental knowledge of operating system
- To become familiar with memory management and other related concepts
- To become familiar with File management

Unit-I **10 hrs**

Introduction: -Introduction- Operating System Structures: System Components - Operating System Services – System Calls – System Structure – Virtual Machine

Unit – II **12 hrs**

Process Management :- Process Concept- Process Scheduling – Inter Process Communication – Threads : Overview – CPU Scheduling : Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Deadlocks:
System model – Deadlock Characterization – Methods of handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection.

Unit – III **12 hrs**

Memory Management : - Address Binding – Swapping – Contiguous memory allocation – Paging – Segmentation – Segmentation with Paging – Virtual Memory : Background – Demand Paging

Unit – IV **14 hrs**

Device and File Management :- File System interface : File Concepts – Access Methods – Directory Structure – File Sharing – File System Implementation : File System Structure – File System Implementation – Mass Storage Structure : Disk Structure – Disk Scheduling.

Unit – V **12 hrs**

Security : The Security problem-User Authentication-Program Threads-System Threats-Security System and Facilities.

Text Book:

Silberchatz A. Peterson J. L . Galvin . P.,“Operating System Concepts”. Addison Wesley, .2001. Sixth edition.

Chapters:

Unit – I	1.1 – 1. 8, 3.1,3.2,3.3,3.5,3.6
Unit- II	4.1, 4.2, 4.5, 5.1, 6.1,6.2,6.3, 8.1, 8.2,8.3,8.4,8.5,8.6
Unit- III	9.1, 9.2 - 9.6, 10.1,10.2
Unit – IV	11.1, 11.2, 11.3, 11.5, 12.1, 12.2, 14.1, 14.2.
Unit- V	19.1 to 19.5.

Reference Book:

Operating System Concepts and Design – Milan Milankovic. Tata McGraw – Hill, 1997.

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DEPARTMENT OF MATHEMATICS
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From 2014-2017batch onwards

Course	: B.Sc. IT	Code No.	:SMI54
Semester	: V	No. of. Hours	: 5 hrs / week
Paper	: Core-18	Credits	: 4
Title of the Paper	: ADVANCED JAVA PROGRAMMING		

UnitI:

12hrs

JDBC and Swing:

Overview – JDBC driver – Connecting to Databases – Statement interface – Result set – Metadata – Tour of swing – JAPPLET – Text field - Button – Combo Boxes – Tabbed Panes – Trees –Tables.

UnitII:

12hrs

Networking and RMI:

Networking Basics -The Networking Classes and Interfaces -InetAddress -Factory Methods -Instance Methods -TCP/IP Client Sockets -URLConnection -HttpURLConnection .The URI Class -TCP/IP Server Sockets -Datagrams -DatagramSocket –DatagramPacket. Remote Method Invocation (RMI) A Simple Client/Server Application Using RMI.

UnitIII:

12hrs

Servlets:

Simple servlets - Servlet life cycle – servlets API – Javax servlets package – parameter – Javax servlets – Generic servlet-http package-http Servlet – working with cookies- session tracking.

UnitIV:

12hrs

JSP:

Syntaxes and semantics – Development model – Component –Commands-Expression – Scriptlets – Declaration-Implicit object-Standard Action .

UnitV:

12hrs

JSP Directive and JSTL:

Include Directive-Page Directives – Taglib Directive-Basic tags in JSTL.

TEXT BOOKS

1.Phil Hanna,**JSP2.0 (Complete reference)**, Tata Mcgraw Hill, 2003

2.Herbert Schildt, **The Complete Reference Java 2**, fifth edition, Tata Mcgraw hill 2002

Unit I : JSP2.0 (Complete reference) – chapter 13

The Complete Reference Java 2 – chapter 26

Unit II : The Complete Reference Java 2 – chapter 18,24(page 824)

Unit III : The Complete Reference Java 2 – chapter 27

Unit IV : JSP2.0 (Complete reference) – chapter 5,6

Unit V : JSP2.0 (Complete reference) – chapter 9,10,11

Reference Books:

1. Hans Bengsten , **Java Server Pages** ,Third Edition ,SPD Publications,

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Course	: B.Sc. IT	Code No.	: SMIL51
Semester	: V	No. of. Hours	: 4 hrs / week
Paper	: Core-19	Credits	: 2
Title of the Paper	: Advanced Java LAB		

1. Create an Employee database, Add fields, records from JAVA using JDBC
2. Create a JAVA program for student database processing using JDBC
3. Create a webpage for shopping mall using jsp and JDBC
4. Create website using Cookies.
5. Write a simple program for multiplication table using JSP.
6. Generate a registration form for a concern using JSP
7. Write a program for filters
8. Write a JSP program for inventory Processing
9. Write a jsp program to implement the different implicit objects.

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Course	: B.Sc. IT	Code No.	:SMIL52
Semester	: V	No. of. Hours	: 2 hrs / week
Paper	: Core-20	Credits	: 2
Title of the Paper	: DTP LAB		

PHOTOSHOP AND PAGEMAKER

1. Create a Route Map.
2. Design an Advertisement with Logo.
3. Create an Identity Card.
4. Design a Broucher.
5. Design a Book Wrapper.
6. Design a Greeting Card.
7. Prepare an attractive Resume.
8. Create a Invitation.
9. Type a document using Text Wrap option.
10. Design a Visiting Card.
11. Type the document using Edit Story option.
12. Design the Yearly Calendar.
13. Design the Monthly Calendar.
14. Design a Photo Album.

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Course : B.Sc. IT Code No. : SMI61
Semester : VI No. of. Hours : 5 hrs / week
Paper : Core-21 Credits : 4
Title of the Paper : **SYSTEM SOFTWARE**

Course Objective:

- To understand about assemblers, loaders, linkers, macros and compilers

Unit I: 15 hrs

Introduction to system software and machine Architecture – Simplified instructional Computer – Tradition machines – RISC Machines.

Assemblers:

Basic assembler functions, machine dependent and machine independent assembler features – Assembler designed options – Implementation Examples.

Unit II: 15 hrs

Loader and Linkers: Basic loader functions – machine dependent and machine independent loader features – Loader design options – Implementations Examples.

Unit III: 15 hrs

Macro Processors: Basic Macro Processor Functions – machine- Independent Macro Processor Features – Implementation Examples.

Unit IV: 15 hrs

Compilers: Basic Compiler Functions – Machine – Dependent Compiler Features – Machine – Independent Compiler Features.

Unit V: 15 hrs

Other System Software: Database Management Systems – Text Editors – Interactive Debugging Systems.

Text Book:

Leland L. Beck, System Software - An Introduction to Systems Programming ,Addison – Wesley 2001

Unit I Ch. 1,2
Unit II Ch. 3
Unit III Ch. 4
Unit IV Ch 5
Unit V Ch. 7

Reference Book:

Damhere, An Introduction to System Software, Tata Mcgraw Hill 1997

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Course	: B.Sc. IT	Code No.	: SMI62
Semester	: VI	No. of. Hours	: 5 hrs / week
Paper	: Core-22	Credits	: 4
Title of the Paper	: C# AND .NET TECHNOLOGIES		

Unit I: **12hrs**

Introducing C# - Understanding .NET: The C# Environment – Overview of C# - Literals, Variables and Data types – Operators and Expressions – Decision making and branching – Decision making and looping.

Unit II: **12hrs**

Methods in C# - Handling arrays – Manipulating Strings – Structures and Enumerations.

Unit III: **12hrs**

Classes and Objects – Inheritance and Polymorphism – Interfaces: Multiple Inheritance – Operator Overloading.

Unit IV: **12hrs**

Delegates and Events – Managing Console I/O operations. Managing Errors and Exceptions

Unit V: **12hrs**

Multithreading– Windows and web-based Application Development on .NET.

Text Book:

Programming in C# A Primer , E.Balagurusamy, Second Edition, Tata McGraw Hill 2008.

Unit I	1 to 7
Unit II	8 to 11
Unit III	12 to 15
Unit IV	16, 17,18
Unit V	19, 20

Reference Book:

C# and .NET Framework, Rober Powell, Richard Weeks, Techmedia pb 2008.

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Course	: B.Sc. IT	Code No.	: SMI63
Semester	: VI	No. of. Hours	: 4 hrs / week
Paper	: Core-23	Credits	: 4
Title of the Paper	: MULTIMEDIA TECHNOLOGIES		

Unit I: **12hrs**

Introduction: Objectives – History of Multimedia – Its market – content copyright – Resources for Multimedia Developers – Types of products – Evaluation – Hardware Architecture – OS and Software – Multimedia Architecture – Software Library – Drivers.

Unit II: **12hrs**

Text and Graphics: Elements of text – Text Data files – Using text in Multimedia Application – Hypertext – Elements of Graphics – Images and Color – Graphics files and Application formats – Obtaining – Images for Multimedia use – Using Graphics in Application.

Unit III: **12hrs**

Digital Audio and Video: Characteristics of sound and Digital audio – Digital Audio systems – MIDI – Audio file formats – Using Audio Multimedia Applications – Audio for content – Background Video – Characteristics of Digital Video – Digital Video Disk Sizing – Video Capture and Playback systems – Computer Animation.

Unit – IV: **12hrs**

Product Design and Authoring Tools: Building Blocks – classes of Products – Content organizational Strategies – Story boarding – Multimedia Tool selection Tool Features – Categories of Authoring Tools – Selecting Right Authoring Paradigm.

Unit V: **12hrs**

Multimedia and Internet: Internet – HTML and web Authoring – Multimedia considerations for Internet – Design considerations for Web pages.

Text Book:

Multimedia Technology and Applications – DAVID HILLMAN 1998. – Golgotha Publications Pvt. Ltd.,

UNIT	CHAPTERS
I	1,2,3,4
II	9,10
III	11,5,6
IV	7,8
V	13,14

ReferenceBook :

Multimedia making it work by Tay Vaughan TMH 1998.

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From 2014-2017batch onwards

Course	: B.Sc. IT	Code No.	:SMI64
Semester	: VI	No. of. Hours	: 5 hrs / week
Paper	: Core-24	Credits	: 3
Title of the Paper	: COMPUTER IN BUSINESS APPLICATIONS		

Unit I: **12hrs**

Needs of Computers in Business and industry Power of Computers to provide information to the manage developing MIS and Decision – Support System – Introduction Expert System.

Unit II: **12hrs**

Nature of Computer Applications – cost and budgetary control, financial applications – accounting payroll, banking, insurance and shocks – detailed discussion of these applications with illustrations discussion of application package.

Unit III: **12hrs**

Computer Applications in

- i) Project Management
- ii) Personnel and Administration – Discussion with illustration – Discussion about packages.

Unit IV: **12hrs**

Applications in Production, planning and control, Materials Management.
Applications in Marketing and Purchasing Credit control, sales forecasting.

Unit V: **12hrs**

Computer Applications in the area of Government, Science & Technology, in Media, in Communication, current epics of Computer Applications like multimedia and advertising.

Text Book:

Computer Today – Suresh K. Pasandra Galcotia Publications Reprinted 1997.
(Chapters 14 and 15)

Reference Books:

- 1) Computer – Technology : Applications and Socket implications K. M. Hussain D.S. Hussain Prentice Hall of India (p) Ltd., 1992.
- 2) Introduction to computer Information Systems for Business Mark G. Sunkin – S, chand & Co. Ltd., New Delhi – 1992.

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Course	: B.Sc. IT	Code No.	:SMIL61
Semester	: IV	No. of. Hours	: 4 hrs / week
Paper	: Core-25	Credits	: 2
Title of the Paper	: .NET LAB		

1.C# Program for printing the following format:

```
1
0 1
1 0 1
0 1 0 1
```

2. C# program for Boxing & UnBoxing.
3. C# program for properties.
4. C# program for Inheritance
5. C# program for the Different Parameter Passing Methods.
6. C# Program for delegate.
7. C# program for the preparation of menu card.
8. C# program to implement the various user Interfaces.
9. C# Program for base class constructor.
10. C# Program for operator overloading.
11. C# Program for window application.
12. C# Program for Pascal triangle.
13. C# Program for class and object.
14. C# Program for user and pre-defined exception.
15. C# Program for method overloading and overriding.

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From 2014-2017batch onwards

LIST OF NON-MAJOR ELECTIVE PAPERS (2 HOURS/WEEK)

- 1) PRINCIPLES OF COMPUTERS(For III semester)
- 2) FUNDAMENTALS OF INTERNET(For IV semester)

LIST OF ELECTIVE PAPERS(5 HOURS/WEEK)

(One elective paper to be chosen in III and V semester)

1. CLIENT/SERVER TECHNOLOGY
2. MOBILE COMPUTING
3. WEB PROGRAMMING
4. COMPILER DESIGN

LIST OF SKILL BASED ELECTIVES(2 Hours/week)

(One elective paper to be chosen in each II , IV & VI semesters)

1. DIGITAL DESIGN LAB
2. MS OFFICE LAB
3. VISUAL BASIC
4. WEB DESIGNING LAB
5. CRYPTOGRAPHY
6. OBJECT ORIENTED ANALYSIS & DESIGN
7. SECURITY IN COMPUTING
8. STRUCTURED SYSTEM ANALYSIS AND DESIGN.

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From 2014-2017batch onwards

Course	: B.Sc. IT	Code No.	: SENI31
Semester	: III	No. of. Hours	: 2 hrs / week
Paper	: NME	Credits	: 2
Title of the Paper	: PRINCIPLES OF COMPUTERS		

Course Objective:

- To get basic idea about computers.
- To understand about basic programming concepts.

Unit I

15hrs

Computers – An Overview:

Introduction to computers - Generation of computers - Classification.

Anatomy of Digital Computer:

Anatomy of Digital Computer – Computer architecture.

Memory and Input Devices:

Memory unit – Input devices.

Unit II

15hrs

Output Devices and Software:

Output devices – Introduction to computer software’s – Types of softwares.

Operating Systems and Languages:

About operating systems – programming languages – types.

Text Book:

Alexi’s leon & Mathews leon, Introduction to Computers, Galgotia Publications.2001

Chapters:

Unit I :1 – 6
Unit II : 7 -8,15

Reference book:

Peter Norton, Introduction to Computers, McGraw-Hill, 2001

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Course	: B.Sc. IT	Code No.	: SENI41
Semester	: IV	No. of. Hours	: 2 hrs / week
Paper	: NME	Credits	: 2
Title of the Paper	: FUNDAMENTALS OF INTERNET		

Course Objective:

To know about the fundamentals of internet.
To become familiar with the network basics.

Unit I

15hrs

Computers – An overview:

Introduction to Computers – Generation of computers – Classification.

Anatomy of Digital Computer:

Anatomy of Digital Computer – Memory unit – Input devices – Output Devices.

Internet and Email:

Introduction – Internet Basics – Protocol – HTML web Browsers – Mailing – Basics – Advantage and Disadvantages.

Unit II

15hrs

Intranet and Multimedia:

Characteristics – Intranet – Basics of Intranet – Benefits of Intranet – Extranet.

Business on the Internet:

Introduction – Web advertising – secure transactions.

Text Book:

Alexi’s leon & Mathews leon, Introduction to Computers, Galgotial Publications.2001

Chapters:

Unit I	: 1-6
Unit II	: 7,8,15

Reference:

Internet Complete reference by Margaret Levine young, Tata Mcgraw, Hill Edition.2001

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Course	: BSc IT	Code. No	:
Semester	: III & V	No. of. Hours	: 5 hrs / week
Paper Core/Allied/Elective/SE	: Elective	Credits	: 3
Title of the Paper	: CLIENT SERVER TECHNOLOGY		

Course Objective:

To enable to student to understand the concept of client server technology
To enable them to know in detail about client server computing.

UNIT 1: 14 hrs

Client/Server system concepts: Introduction – concepts – N-tier vs. 2-Tier Client/server Architecture – 2-Tier Architecture – 3-Tier Architecture – Case study of N-Tier Architecture – client/server characteristics – upsizing – downsizing – rightsizing -Client/server Models – Types of Servers and Clients.

UNIT 2: 15 hrs

Client/Server System Architecture: Client/Server building blocks – Hardware, software, Middleware – Types of Middleware – DLE, MOM, Transaction Processing Monitors, ODBC – Needs for Database Connectivity – Design Overview of ODBC - Architecture - Components – Applications - Driver Managers – Drivers – Data Source – ODBC 2.5 and ODBC 3.0 – Operating System Services – Base Services – External Services – Server Scalability.

UNIT 3: 17 hrs

Client/Server Database: SQL Database Servers - Server Architecture – Multithread Architecture – Hybrid Architecture – Stored Procedures – Triggers – Rules of processing – Transaction Models – Chained and Nested Transactions – TP MONITORs -Transaction Management Standards-TP lite and TPheavy

UNIT 4: 15 hrs

Client/Server Protocols: Data Warehousing – Data Mining-RPC (Remote Procedure Calls) – IPC.

UNIT 5: Client/Server and the Internet: 14 hrs

Web client/server – Hypertext Era – URL, HTML, HTTP – Interactive Era – Web-based forms – Server side of the web – web security – OLE/DCOM.

TEXT BOOKS:

- 1.Robert Orfali, Dan Harkey and Jerri Edwards, “Essential Client/Server Survival Guide”, John Wiley and Sons Inc., 1996.
- 2.Neil Jenkins, et al., “Client/Server Unleashed”, Techmedia.1997

Chapters:

- Unit I : chap. 2 in book 1, chap 1 in book 2
Unit II :chap. 3,5 in book 1, chap 11 in book 2
Unit III : chap. 10,16,17,18 in book 1
Unit IV : chap 8,12 in book1, chap. 8 in book 2
Unit v : 26,27,28 in book 1

REFERENCES:

- Joe Salemi, “ Client/Server Databases”.HILL PUBLICATIONS 1997
Patrick Smith et al. “Client/Server Computing”. Techmedia.1997

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Course	: B.Sc. IT	Code No.	:
Semester	: III & V	No. of. Hours	: 5 hrs / week
Paper	: Elective	Credits	: 3
Title of the Paper	: MOBILE COMPUTING		

Course Objective:

To get the ideas about the mobile computing.

UNIT I: 15 Hrs

Introduction – Mobility of Bits and Bytes –Wireless the Beginning – Mobile computing – Dialogue control- Networks – Middleware and Gateways-Applications and Services – Developing Mobile computing Applications –Security in Mobile computing –Standards- why it is necessary – Standard Bodies –Players in the wireless space.

UNIT II: 15 Hrs

Mobile computing Architecture: History of Computers – History of Internet –Internet – The Ubiquitous Network – Architecture for mobile computing – Three –tier architecture – Design consideration for mobile computing – mobile computing through Internet – making existing applications mobile enabled.

UNIT III : 15 Hrs

Mobile computing through Telephony – Evolution of Telephony – Multiple Access Procedures – mobile computing through telephone – Developing an IVR application – voice XML – Telephony application Programming Interface.

UNIT IV: 15 Hrs

Global System for Mobile Communication – Global System for Mobile communications – GSM Architecture – GSM Entities – call routing in GSM – PLMN interfaces – GSM address and Identifiers – Network aspects in GSM- GSM Frequency allocation – Authentication and security.

UNIT V: 15 Hrs

General packet radio service: introduction –GPRS and packet data network-GPRS network architecture-GPRS network operation –data service in GPRS-application for GPRS-limitation of GPRS-Billing and charging in GPRS.

Text Book

Mobile computing tech application and service creation, Asoke K Talukder, Roopa, 2003
R Yavagal, THH publishing company New Delhi, 2005.

Unit I :1-2

Unit II :3.1-3.6 to 4

Unit III :5-6.4

Unit IV :9,11

Unit v :12.1-12.3,15.1,15.2

Reference Book:

Mobile Communication-Jochen schiller 2nd edition pearson 2003.

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Course : B.Sc. IT Code No. :
Semester : III & V No. of. Hours : 5 hrs / week
Paper : Elective Credits : 3
Title of the Paper : **WEB PROGRAMMING**

Unit I:

15 hrs

Internet – Basic Concepts :

Connecting to DialUp Accounting- High Speed Connections:
ISDN, ADSL Modems – Extended- HighSpeed Connection-ISDN-ASDL-Modem-Email
Concepts.

Unit II:

15hrs

Essential HTML – Working with Text – Presenting and Arranging Text – Working with
Images – Links and Lists.

Unit III:

15hrs

Creating Tables – Working with Frames – Working with Multimedia – Working with
style sheets.

Unit IV:

15hrs

Essential Javascript – Putting Javascript to work – Creating HTML forms and HTML
Controls.

Unit V:

15hrs

Dynamic HTML: Drag and Drop, Data Binding and Behaviors – Essential XML.

Text Book:

Margaret Levine Young, Internet Complete Reference (Millennium Edition) (Tata
Mcgraw Hill), 2001

Chapters:

Unit I : 1,2,3,5
Unit II : 1,2,3,4,5
Unit III : 6,7,8,9
Unit IV : 10,11,12
Unit V : 14, 17

Reference Book:

HTML Black Book, Steven Holzner, Dreamtech Press. Tata Mcgraw Hill ,2001

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Course	: B.Sc. IT	Code No.	:
Semester	: III & V	No. of. Hours	: 5 hrs / week
Paper	: Elective	Credits	: 3
Title of the Paper	: COMPILER DESIGN		

Course Objective:

To get the ideas about the process of Compiler.

Unit I **14 Hrs**

Introduction to Compilers:
Compilers and Translators-Structure of a compiler-programming languages.

Unit II **15 Hrs**

Parse Tree:
Finite Automata & Lexical Analysis-Minimizing the number of states of DFA. Syntactic specification of programming languages-Context -free grammars. Derivations and parse Trees-Capabilities of Context -free grammars .

Unit III **17 Hrs**

Parse Tree & Symbol Tables:
Parse Tree-Basic parsing Techniques-Automatic construction of Parser-LR,SLR Parsers.

Unit IV **15Hrs**

Symbol tables & Error Detection:
Symbol tables-Content -Data structures –Errors-Lexical, Syntatic, Semanic errors.

Unit V **14 Hrs**

Code Optimization:
Principal of sources of optimization-loop optimization-DAG representation of
Basic Blocks-Code Generation -Problems of Code Generation.

Text Book:

Alfred V. AHO , Principles of Compiler Design, Narosa Publishing.2001

Chapters:

Unit I :1-2
Unit II :3.1-3.6 to 4
Unit III :5-6.4
Unit IV :9,11
Unit v :12.1-12.3,15.1,15.2

Reference Book:

Y.N.Srikant,Compler Design Handbook,CRC press.2001

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Course	: B.Sc. IT	Code No.	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs/week
Paper	: SBE	Credits	: 2
Title of the Paper	: Digital Design Lab		

Combinational Logic Circuits:

Digital Logic Gates, Logic Building Blocks, Boolean Equation, De Morgan's Theory, Binary Half adder and Full adder, Binary Half subtracter and Full subtracter.

Sequential Logic Circuits:

RS & RS Filpflops.

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Course	: B.Sc. IT	Code No.	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs/week
Paper	: SBE	Credits	: 2
Title of the Paper	: MS Office Lab		

Excel:

- 1.To find Mean and Median.
- 2.Tax Calculation.
- 3.Prepare a Excel sheet for Sales analysis.
- 4.Prepare a Excel sheet for Cricket Scores for two teams, and display the output using Line Chart.
- 5.Prepare a Sales budget for a first Quarter.
- 6.Prepare a Excel sheet for Foreign Money Exchange
- 7.Personal data for Staff Members, Short out the name in Alphabetical Order.
- 8.Programs using Excel Pivot Table
- 9.Programs using Excel Data Base
10. Programs using Excel Macros.

Word:

11. Program using Formatting Toolbar
12. Program using Table
13. Program using Mail merge & Templates
14. Program using graphics& wizards.

Power point

- 15.Program using slide show

AccessseqQq

16. Program to create a database file (Relationship)
17. Program using query.
18. program to create forms and reports.

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Course	: B.Sc. IT	Code No.	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs / week
Paper	:SBE	Credits	: 2
Title of the Paper	: VISUAL BASIC		

Course Objective:

To become familiar with the basics of visual basic concepts.
To get idea about simple visual basic programming.

Unit I **15hrs**

INTRODUCTION :

Getting started –VB environment-Writing simple programs-user interfaces-data types-variables.

Unit II **15hrs**

Functions & Control flow structures:

Displaying information-controlling program flow-built in functions-user defined functions-procedures-graphics.

Text Book:

1. Gary Cornell,Groud up reference,Tata McGraw Hill.1998
2. HTML Black Book, Steven Holzner,Paraglyph Press.2001

Reference:

1. Noel Jerke,Visual Basic Complete reference , Tata McGraw Hill.1997
2. Steven Holzaer XHTML- BlackBook (DreamTechPress)2001

Chapters: (Text Book -1)

Unit I :4,6,7,8,9,10,11

Unit IV :27,28,29

Chapters: (Text Book -2)

Unit I :2,3,4,5,6

Unit IV :10,11,12,17

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DEPARTMENT OF MATHEMATICS
BACHELOR OF INFORMATION TECHNOLOGY
From 2014-2017batch onwards

Course : B.Sc. IT Code No. :
Semester : II/IV/VI No. of. Hours : 2 hrs / week
Paper : SBE Credits : 2
Title of the Paper : **WEB DESIGNING LAB**

1. Creating Dynamic Web site for a shopping mall using DHTML.
2. Creating web page using XML.
3. Web page validation using Java script
4. Creating a style sheet using java script
5. Creating forms using java script and JDBC
6. create a web site for our college with minimum number of pages.
7. create a web site for online Quiz.

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DEPARTMENT OF MATHEMATICS
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From 2014-2017batch onwards

Course	: B.Sc. IT	Code No.	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs / week
Paper	: SBE	Credits	: 2
Title of the Paper	: CRYPTOGRAPHY		

Course Objective:

To become familiar with the basics of cryptography
To know about computer security.

Unit 1:

Introduction- the concept of security-introduction the need for security - security approaches-principles of security – types of attacks. Cryptography techniques: introduction-plaintext and cipher text- substitution techniques –transposition techniques-encryption and decryption – symmetric and asymmetric key cryptography – stenography -- key range and key size - possible types of attacks.

Unit 2:

Computer based symmetric Key Cryptography Algorithms: Introduction-Algorithm Types and Modes-An overview of Symmetric Key Cryptography-Data Encryption Standard(DES)-International Data Encryption Algorithm(IDEA)-RC5-Blow fish- Advanced Encryption Standard(AES)-Differential and linear Cryptanalysis-Computer Based Asymmetric Cryptography Algorithm: Introduction-Brief History of Asymmetric Cryptography-An overview of Asymmetric Key Cryptography-The RSA algorithm- Symmetric and Asymmetric Key Cryptography together-Digital Signatures-Knapsack Algorithm-Some other Algorithm

Text book:

Cryptography and Network Security, Atul Kahate, TMH 2006

Reference Book:

Cryptography and Network Security-Behrouz A.Forcizan, The MC Graw Hill, 2008

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Course	: B.Sc. IT	Code No.	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs / week
Paper	: SBE	Credits	: 2
Title of the Paper	: OBJECT ORIENTED ANALYSIS & DESIGN		

Course objectives:

To become familiar with object models and its process
To understand the implementations and applications of UML diagrams

Unit I:

15 hrs

The Object model: Evaluation of object model – Elements of object model –Applying the object model

Classes and objects :Nature of an object –Relationship among objects –Nature of a classes –Relationship among classes –The interplay of class and objects –On building classes and objects

UML: Unified modeling language –Packaged diagrams –Component diagrams – Deployment diagrams – Use case diagrams

Unit II

15 hrs

: Activity diagrams –Class diagrams –Sequence diagrams –Interaction overview diagrams –Composite structure diagrams –State machine diagrams –Timing diagrams –Object diagrams –Communication diagrams.

Text book:

Object – Oriented analysis and design with applications, 3/E by Grady Booch, 2006.

Chapters

Unit I: 2.1-2.4, 3.1-3.6, 5.1-5.5

Unit II: 5.6 – 5.14.

Reference book:

Object oriented analysis and design, Ramalingam.G Tata Mcgraw Hill Publications-2005

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Course	: B.Sc. IT	Code No.	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs / week
Paper	: SBE	Credits	: 2
Title of the Paper	: Security in Computing		

Course Objective: To understand Security standards in computing.
To enable the student to understand the concepts of Security.

Unit I **15Hrs**
Secure mean-Attacks- Meaning of computer security-computer criminals-methods of defense

Unit II **15Hrs**
Terminology and Background-Substitution Ciphers-transpositions
Program security: secure programs- virus and other malicious code-targeted malicious code

Text book:

Security in computing - Third Edition, Charles Pfleeger.Shari Lawrence Pfleeger, PHI 2005

Unit I	Ch1 (1.1 to 1.5)
	Ch2 (2.2 to 2.4)
Unit II	Ch3 (3.1 to 3.6)
	Ch4 (4.1 to 4.3)

Reference Book:

Cryptography and Network Security –Behrouz A.Forouzan, Mc graw Hill, 2008

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Course	: B.Sc. IT	Code No.	:
Semester	: II/IV/VI	No. of. Hours	: 2 hrs / week
Paper	: SBE	Credits	: 2
Title of the Paper	: Structured System Analysis and Design		

Course Objective:

To enable the student to understand the concepts of software structure.
To enable them to know in detail about Project Management & Software analysis and design techniques.

Unit I

15 Hrs

System concepts and Theory: Definition and basic concepts - Elements of a system - real life Business systems-System Models- Types of Systems.

Unit II

15Hrs

System Development Life cycle: System development life cycle- Capability Maturity Model-System development life cycle

System development process model: Project and process management – Prototyping Model –Rapid Application Development –Spiral Model

Text Book:

Structured System Analysis and Design ISRD Group,Tata Mc Graw Hill,2007

Unit I	Ch1 (1.1 to 1.3)
	Ch2 (2.1 to 2.4)
Unit II	Ch3 (3.1 to 3.5)
	Ch4 (4.1 to 4.5)

Reference Book:

System Analysis and Design, Awad, Galgotia Publishers, 2006

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From 2014-2017batch onwards

Course	: B.Sc. IT	Code No.	:
Semester	: V	No. of. Hours	: 2 hrs / week
Paper	: Self Study	Credits	: 2
Title of the Paper	: Computers and Internet Applications		

Course Objective:

To get basic idea about computers.
To understand about basic programming concepts.
To understand concepts of Web Applications and Internet.

Unit I:

Computers- An Overview: Introduction to computers- Generation of Computers- Classification of Computers. Anatomy of Digital Computer: Anatomy of Digital Computer.

Unit II:

Memory and Input Devices- Memory Unit- Input Devices- Output Devices- Introduction to Computer Software's- Types of Computer Software's- Operating System and Languages: About Operating System- Programming Languages- Types.

Unit III:

Internet and E-mail: Introduction-Internet Basics- Protocol- HTML Web Browsers- Mailing Basics- Advantages and Disadvantages.

Unit IV:

Intranet and Multimedia: Characteristics- Intranet – Basics of Intranet- Benefits of Intranet.

Unit V:

Business on Internet: Introduction- Web Advertising- Secure Transaction

Text Book:

Alexi's leon and Mathews leon, Introductions to Computers, Galgotia Publications.2001

Unit I –chapters 1,2

Unit II –chapters 3,4

Unit III –chapters 5,6

Unit IV –chapters 7,8

Unit V –chapters 15

Reference Books:

- 1.HTML Black Book, Steven Holzner, Paraglyph Press,2001.
2. Steven Holzaer XHTML Blackbook(Dream Tech Press) 2001.

Certificate/ Diploma Course

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF MATHEMATICS
(From 2014 – 2015 Batch onwards)

Certificate Course in LATEX
COURSE STRUCTURE (w.e.f. 2014 – 2017 batch onwards)

Code No.	Credits	Total No. of Hours Allotted/year	Max. Marks		
			CA	VIVA	Total
		40	25	75	100

Exam Pattern: Project only

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Course	: Certificate	Code No.	:
Semester	: I and II	No. of hours allotted	:
Paper	:	No. of credits	:
Title of the Paper	: Certificate Course in LATEX		

Text formatting

TEX and its offspring – What’s different in LaTeX 2 ϵ – Distinguishing LATEX 2 ϵ – Basics of LATEX file

Commands and environments

Command names arguments – Environments – Declarations – Lengths – Special Characters – Exercise – Fine-tuning text – Word division

Document Layout and Organization

Document class – Page style – Parts of the document – Table of contents

Displayed Text

Changing font – Centering and indenting – Lists – Generalizes lists – Theorem-like declarations – Tabular stops – Boxes

Mathematical formulae

Mathematical environments – Main elements of Math mode – Mathematical symbols – Additional elements – Fine-tuning Mathematics

Graphics inclusion

The graphics packages

Floating tables and figures

Float placement – Postponing floats – Style parameters for floats – Float captions – Float examples – References to figures and tables in text – Some float packages

Reference Book :

A Guide to LATEX – H. Kopka and P.W. Daly, Addison-Wesley, 4th Edition, 1999

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DEPARTMENT OF MATHEMATICS
(From 2014 – 2015 Batch onwards)

Diploma in Problem Solving using Mathematica Tools
COURSE STRUCTURE (w.e.f. 2014 – 2016 batch onwards)

Code No.	Credits	Total No. of Hours Allotted/year	Max. Marks		
			CA	VIVA	Total
		60	25	75	100

Exam Pattern: Project only

THIAGARAJAR COLLEGE, MADURAI – 9.
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DEPARTMENT OF MATHEMATICS
(From 2014 – 2015 Batch onwards)

Course	: Diploma	Code No.	:
Semester	: I and II	No. of hours allotted	:
Paper	:	No. of credits	:
Title of the Paper	: Diploma in Problem Solving using Mathematica Tools		

Core Language

Language Overview – Expressions – Rules & Patterns – Procedural Programming – Parallel Programming – Package Development – Syntax – Units – Lists – Variables & Functions – Functional Programming – Sting Manipulation – External Operations – Tuning & Debugging.

Mathematics and Algorithm

Mathematical functions – Formula manipulation – Matrices & Linear Algebra – calculus – Polynomial Algebra – Graphs & Networks – Logic & Boolean Algebra – Control Systems – Mathematical Data – Numbers & Precision – Equation Solving – Optimization – Probability & Statistics – Discrete Math – Number Theory – Computational systems – Finance .

Visualization and graphics

Data visualization – Charting – Statistical visualization – Gauges – Drawing & interactivity – computational Geometry – Sound & Sonification – Function visualization – Dynamic visualization – Financial visualization – Options & Styling – Symbolic Graphics language – Importing & Exporting

Data Manipulation

Importing & Exporting – Numerical Data – Image Processing – Text Processing – Files – Date & time – Arrays – Statistical data Analysis – Signal Processing – Binary data – Databases.

Computable Data

Mathematical data – Geographic Data – Linguistic Data – Scientific and Technical Data – Financial and Economic Data.

Dynamic Interactivity

Interactive Manipulation – Control Objects – Dynamic Interactivity Language – Viewers & Annotation – Generalized Input – Custom Interface Construction.

Note Books and Documents

Notebook Basics – Special Characters – Math Typesetting – Presentations – Document Generation – Wolfram Predictive Interface – Formatting & Styling – Layout & tables – Customization – Importing & Exporting – Notebook Programming.

System Interface & Deployment

Mathematica Sessions – File Operations – External Programs – C - .NET- XML – Parallel Computing – System Setup – Web – Mathlink – Java – R – Standlone Kernels.

Reference:

Wofram Mathematica 9 Documentation – Original