## Scheme of Examination

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<th>Part</th>
<th>Study Components</th>
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<td>IV</td>
<td>Skill based Subject - Operations Research - I</td>
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<td>IV</td>
<td>Tamil @ / Advanced Tamil# (OR)</td>
<td>Non-major elective - I (Yoga for Human Excellence)# / Women’s Rights#</td>
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### Semester IV

| III | Core Paper VIII- Differential Equation & Laplace Transform | 5 | 3 | 25 | 75 | 100 | 4 |
| III | Core Paper IX- Dynamics | 5 | 3 | 25 | 75 | 100 | 4 |
| III | Core Paper X- RDBMS ORACLE | 5 | 3 | 25 | 75 | 100 | 4 |
|     | Practical RDBMS Lab | 2 | 3 | 20 | 30 | 50 | 2 |
| III | Allied B - Paper I  Physics II / Chemistry II (or) | 5 | 3 | 20 | 55 | 75 | 3 |
|     | Acc. II | 7 | 3 | 25 | 75 | 100 | 4 |
| III | Allied Practical | 2 | 3 | 20 | 30 | 50 | 2 |
| IV  | Skill based Subject - Operations Research – Paper II | 3 | 3 | 20 | 55 | 75 | 3 |
| IV  | Tamil @ /Advanced Tamil # (OR) | 2 | 3 | 50 | 50 | 2 |
|     | Non-major elective -II (General Awareness #) | 2 | 3 | 50 | 50 | 2 |

### Semester V

| III | Core Paper XII-Real Analysis | 5 | 3 | 25 | 75 | 100 | 4 |
| III | Core Paper XIII- Modern Algebra | 5 | 3 | 25 | 75 | 100 | 4 |
| III | Core Paper XIV- Visual Basic | 4 | 3 | 25 | 75 | 100 | 4 |
|     | Practical – VB Lab | 3 | 3 | 20 | 30 | 50 | 2 |
| III | Core Paper XV- Discrete Mathematics | 5 | 3 | 25 | 75 | 100 | 4 |
| III | Elective I | 5 | 3 | 25 | 75 | 100 | 4 |
| IV  | Skill based Subject - Operations Research Paper III | 3 | 3 | 20 | 55 | 75 | 3 |

### Semester VI

| III | Core Paper XVI Complex Analysis | 5 | 3 | 25 | 75 | 100 | 4 |
| III | Core Paper XVII Internet & Java | 5 | 3 | 25 | 75 | 100 | 4 |
| III | Elective II | 6 | 3 | 25 | 75 | 100 | 4 |
| III | Elective III | 6 | 3 | 25 | 75 | 100 | 4 |
| III | Core Paper XVIII Lab: Internet Java | 5 | 3 | 20 | 30 | 50 | 2 |
| IV  | Skill Based Subject-Operations Research – Project * | - | - | - | - | 75* | 3 |
| V   | Extension Activities @ | - | - | 50 | - | 50 | 2 |

| Total | 3500 | 140 |

* Project : Viva-voce : 20; Report : 80  
@ No University Examinations. Only Continuous Internal Assessment (CIA)  
# No Continuous Internal Assessment (CIA). Only University Examinations.  

### List of Elective papers (Colleges can choose any one of the paper as electives)

| Elective – I | A | Astronomy- I |
|             | B | Numerical Methods-I |
|             | C | Graph Theory |

| Elective – II | A | Astronomy- II |
|              | B | Numerical Methods-II |
|              | C | Digital Electronics and Computer Fundamentals |

| Elective - III | A | Automata Theory & Formal Languages |
|               | B | Fuzzy logic and Neural Networks |
Subject title: Classical Algebra

Credit hours-4

Subject Description: This course focuses on the convergence and divergence of different types of series also discusses the standard methods of solving both polynomial and transcendental type equations.

Goal: To enable the students to learn about the convergence and divergence of the series and to find the roots for the different types of the equation.

Objectives: On successful completion of this course the students should gain knowledge about the convergence of series and solving equations.

UNIT I:
Binomial, exponential theorems-their statements and proofs – their immediate application to summation and approximation only.

UNIT II:
Logarithmic series theorem-statement and proof-immediate application to summation and approximation only. Convergency and divergency of series-defininitions, elementary results-comparison tests- De Alemberts and Cauchy’s tests.

UNIT III:
Absolute convergence-series of positive terms-Cauchy’s condensation test-Raabe’s test.

UNIT IV:
Theory of equations: Roots of an equation- Relations connecting the roots and coefficients-transformations of equations-character and position of roots-Descarte’s rule of signs-symmetric function of roots-Reciprocal equations.

UNIT V:
Multiple roots-Rolle’s theorem - position of real roots of f(x)=0 – Newton’s method of approximation to a root – Horner’s method.

Treatment as in

Reference:
Subject title: CALCULUS

Subject description:
This course presents the idea of curvatures, integration of different types of functions, its geometrical applications, double, triple integrals and improper integrals.

Goal:
To enable the students to learn and gain knowledge about curvatures, integrations and its geometrical applications.

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

UNIT I:
Curvature-radius of curvature in Cartesian and polar forms-evolutes and envelopes-pedal equations-total differentiation-Euler’s theorem of homogeneous functions.

UNIT II:
Integration of $f'(x)/f(x), f''(x)\sqrt{f(x)} \sqrt{(px+q)}/\sqrt{(ax^2+bx+c)}$, $\sqrt{(x-a)/(b-x)}$, $1/\sqrt{(x-a)(b-x)}$, $1/(acosx+bsinx+c)$, $1/(acos^2x+bsin^2x+c)$, Integration by parts

UNIT III:
Reduction formulae-problems-evaluation of double and triple integrals-applications to calculations of areas and volumes-areas in polar coordinates.

UNIT IV:
Change of order of integration in double integral-Jacobions.- change of variables in double and triple integrals.

UNIT V:
Notion of improper integrals, their convergence, simple tests for convergence simple problems, Beta and Gamma Integrals-their properties, relation between them-evaluation of multiple integrals using Beta and Gamma functions.

Treatment as in

Reference:
Subject title: ANALYTICAL GEOMETRY  
Credit hours-4

Subject Description:
This course gives emphasis to enhance student knowledge in two dimensional and three dimensional analytical geometry. Particularly about two dimensional conic sections in polar coordinates and the geometrical aspects of three dimensional figs, viz, sphere, cone and cylinder.

Goal:
To enable the students to learn and visualize the fundamental ideas about co-ordinate geometry.

UNIT - I:
Analytical geometry of two dimensions :- Polar coordinates Equation of a conic- directrix-chord-tangent-normal-simple problems – only in deriving equation of a conic.

UNIT –II:
Analytical geometry of three dimensions:-Straight lines-Coplanarity of st.lines- Shortest distance (S.D) and Equation of S.D between two lines-simple problems.

UNIT –III:
SPHERE: Standard equation of sphere –results based on the properties of a sphere- Tangent plane to a sphere – Equations of a circle.

UNIT –IV:
CONE AND CYLINDER:- cone whose vertex is at the origen-envelopingcone of a sphere-right circular cone-equation of a cylinder-right circular cylinder.

UNIT –V:
CONICOIDS:-Nature of a conicoid-Standard equation of a central conicoid- Enveloping cone-Tangent plane – conditions for tangency –Director sphere and Director plane.

Treatment as in
1. Analytical Geometry by P.Durai Pandian & others.

Reference:
Subject Title: Programming in C  

Subject Description: This paper presents the importance of c language, its structure, Data types, Operators of C, Various control statements, Arrays, different types of functions and practical problems.

Goals: To enable the students to learn about the basic structure, Statements, arrays, functions and various concepts of C language.

Objectives: On successful completion of the course the students should have:
- Learnt the basic structure, operators and statements of c language.
- Learnt the decision making statements and to solve the problems based on it.
- Learnt arrays, functions and solve the problems Regarding about it.


UNIT IV: The WHILE statement - the DO statement the FOR statement – Jumps in loops.

UNIT V: One, Two dimensional arrays – Initiating two dimensional arrays – Multidimensional arrays – Declaring and initializing string variables – reading strings from terminal – Writing strings on the screen – Arithmetic operations on characters.

TEXT BOOK: 

REFERENCE BOOKS: 
   Published by Prentice- Hall of India Privated Limited, M-97,New Delhi-110001.
C-PROGRAMMING PRACTICAL LIST.

1. Write a C program to generate ‘N’ Fibonacci number.
2. Write a C program to print all possible roots for a given quadratic equation.
3. Write a C program to calculate the statistical values of mean, median, mode, Standard Deviation and variance of the given data.
4. Write a C program to sort a set of numbers.
5. Write a C program to sort the given set of names.
6. Write a C program to find factorial value of a given number ‘N’ using recursive function call.
7. Write a C program to find the product of two given matrix.
8. Write a C program to prepare pay list for a given data.

Semester: III Core Paper - V

SUBJECT TITLE: Trigonometry, Vector Calculus and Fourier Series

UNIT –I:
Expansion of Cos nφ, Sin nφ, Cos^n φ, Sin^n φ – Hyperbolic functions – Separations of real and imaginary parts of Sin (α+iβ ), Cos (α +iβ ), Tan(α+iβ ), Sinh(α +iβ ), Cosh(α +iβ ), Tanh (α +iβ ), Tan^{-1} (α +iβ)

UNIT-II:
Logarithm of a complex number-Summation of trigonometric Series.

UNIT-III:
Scalar and vector point functions-Differentiation of vectors-Differential operators –Directional derivative, gradient, Divergence, Curl.

UNIT-IV:
Integration for vectors: Line, Surface and Volume integrals, Theorems of Gauss, Green, Stokes (Statements only) – Verifications.

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

Treatment as in ‘Trigonometry’ by Narayanan and T K M
Vector calculus by P.Duraipandian
Fourier series by S.Narayanan
Question paper setters to confine to the above text books only.
Subject title: Statics

Subject Description:
This course contains the nature of forces acting on a surface, friction and center of gravity.

Goal:
To enable the students to realize the nature of forces and resultant forces when more than one force acting on a particle.

Objectives:
On successful completion of course the students should realize the concept about the forces, resultant force of more than one force acting on a surface, friction and center of gravity. Also he can differentiate static and dynamic forces.

UNIT-I
Forces acting at a point – Parallelogram law-triangle law -

UNIT- II
(λ,μ) theorem - Polygon of forces-conditions of equilibrium.

UNIT – III
Parallel Forces-Moments and couples composition of parallel forces (like and unlike)

UNIT – IV
Moment of a force about a point-Varignons theorem - Co-planar forces acting on a rigid body – Theorem on three co-planar forces in equilibrium

UNIT – V
Reduction of a system of co-planar forces to a single force and a couple - necessary & sufficient conditions of equilibrium only – Equation to the line of action of the resultant.

Treatment as in

References
Semester: III Core Paper – VII

Subject Title: PROGRAMMING IN C++

Subject Description: This paper presents the importance of class structure, operators, the types of inheritance and polymorphism, file handling.

Goals: To enable the students to learn about the class structure, operators, inheritance, polymorphism, file handling.

Objectives: On successful completion of the course the students should have learnt class structure, member functions & data members.
Learnt the concept of inheritance, types and example problems.
Learnt the concepts of polymorphism, types and problems.
Learnt the concepts of File handling.

UNIT-I:

UNIT-II:

UNIT-III:

UNIT-IV:
UNIT-V:

Text Books:
1. E.Balagurusamy - ‘Object Oriented programming with C++’, McGraw Hill.

Reference Books:

PROGRAMMING IN C++ : PRACTICAL LIST.

1. Write a function ‘power( )’to raise a number ‘m’ to a power ‘n’. The function takes a ‘double’ value for ‘m’ and ‘int’ value for ‘n’, and returns the result correctly. Use a default value of 2 for ‘n’ to make the function to calculate squares when this argument is omitted. Write a ‘main( )’ that gets the values of ‘m’ and ‘n’ from the user to test the function.

2. Write a program to compute compound interest of a given amount AMT for ‘n’ years. Use function overloading so that the program gets input of interest rate RATE in any of the data type ‘float’ or ‘int’.

3. Create a class which consist of employee detail ENO, ENAME, DEPT, BASIC SALARY. Write a member function to get and display them. Derive a class PAY from the above class and write a member function to calculate DA, HRA and PF depending on the grade and display the payslip in a neat format using console I/O.

4. Define two classes POLAR and RECTANGLE to represent points in the polar and rectangle system. Write a program to convert from one system to another.

5. Create a class FLOAT that contains one float data member. Overload all the four arithmetic operators so that they operate on the objects of FLOAT.
Skill Based Subject - Semester III

Subject title: Operations Research – Paper I

Credit hours: 3

Subject description:
This course contains advantages, limitations and applications of O.R, formulation of Linear Programming Problems (L.P.P), methods to solve L.P.P. like simplex method, Charnes Penalty Method and Two Phase Simplex method. Also it deals about duality in L.P.P, Transportation and Assignment Problems with applications

Goal:
It enables the students to use the mathematical knowledge in optimal use of resources.

Objectives:
On successful completion of this course students should have gained knowledge about optimal use of resources.

Unit I:

Unit II:
Simplex Method – Charnes Penalty Method (or) Big – M Method - Two Phase Simplex method – Problems.

Unit III:
Duality in L.P.P – Concept of duality – Duality and Simplex Method – Problems

Unit IV:
The transportation Problems – Basic feasible solution by L.C.M – NWC- VAM-optimum solutions – unbalanced Transportation problems

Unit V:

References:
Subject Title: Differential Equations and Laplace Transforms  Credit Hours: 5

Subject Descriptions: This course presents the method of solving ordinary differential Equations of First Order and Second Order, Partial Differential equations. Also it deals with Laplace Transforms, its inverse and Application of Laplace Transform in solving First and Second Order Differential Equations with constant coefficients.

Goals: It enables the students to learn the method of solving Differential Equations.

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

Unit I:

Ordinary Differential Equations: Equations of First Order and of Degree Higher than one – Solvable for p, x, y – Clairaut’s Equation – Simultaneous Differential Equations with constant coefficients of the form

i) \( f_1(D)x + g_1(D)y = \phi_1(t) \)

ii) \( f_2(D)x + g_2(D)y = \phi_2(t) \)

where \( f_1, g_1, f_2 \) and \( g_2 \) are rational functions \( D = \frac{d}{dt} \) with constant coefficients \( \phi_1 \) and \( \phi_2 \) explicit functions of \( t \).

Unit II:

Finding the solution of Second and Higher Order with constant coefficients with Right Hand Side is of the form \( Ve^{at} \) where \( V \) is a function of \( x \) – Euler’s Homogeneous Linear Differential Equations – Method of variation of parameters.

Unit III:


Unit IV:

Laplace Transforms: Definition – Laplace Transforms of standard functions – Linearity property – Firsting Shifting Theorem – Transform of \( tf(t), \frac{f(t)}{t}, f'(t), f''(t) \).

Unit V:

Inverse Laplace Transforms – Applications to solutions of First Order and Second Order Differential Equations with constant coefficients.

Treatment as in
Subject title: Dynamics

Subject Description: This course provides the knowledge about the field Kinematics, projectile, simple harmonic motion and impact of a particle on a surface.

Goal: To enable the students to apply Laws, Principles, Postulates governing the Dynamics in physical reality.

Objectives: End of this course, the student understand the reason for dynamic changes in the body.

UNIT – I
Projectiles: Path of a projectile-Greatest height-time of flight-range on an inclined plane through the point of projection-Maximum range.

UNIT – II

UNIT – III
Simple Harmonic Motion: Amplitude, periodic time, phase-composition of two simple harmonic motions of the same period in a straight line and in two perpendicular lines.

UNIT – IV
Impact on a fixed surface: Impulsive force-Impact on a smooth fixed plane –Direct and oblique impact of two smooth spheres

UNIT – V
Loss of Kinetic energy during direct and oblique impacts.

Treatment as in

References
Semester: IV  Core Paper -X

Subject Title: RDBMS AND ORACLE  CREDIT HOURS: 5

Subject Description:
This paper presents the basic concepts of DBMS, Keys, RDBMS, introduction to SQL, ORACLE data types, Queries in SQL, introduction to PL/SQL, its basic structure, triggers, basic concepts of forms, reports and practical problems.

Goals:
To enable the students to learn about the basic concepts of DBMS, RDBMS, SQL, PL/SQL, forms and Reports.

Objectives:
On successful completion of the course the students should have learnt the basic concepts of DBMS and RDBMS.
Learn to build a queries using SQL, PL/SQL.
Learnt to design a forms and reports using ORACLE Developer 2000.

UNIT –I:

TEXT BOOKS:
For unit 1 treatment as in “Introduction to Database System” – Bipin Desai [chapter 1, sections 4.2 and 6.5.1 and 6.5.2]

UNIT II:
Integrative SQL – invoking SQL plus, data manipulation in DBMS, The ORACLE data types, two dimention matrix creation, Intersect of data into tables, data constrains, computation in expression lists used to select data, logical operation, Range searching, pattern matching, Orac’e function, Grouping data from tables in SQL, Manipulating dates on SQL, joins, subqueries.

UNIT III:
PL/SQL-Introduction, The PL/SQL execution environment, the PL/SQL syntax, Understanding the PL/SQL Block structure, database triggers.

UNIT IV:
Working with forms, Basic concepts, Application development in forms, Form module, Blocks items, Canvas view windows, Creating a form Generating and running a form, Using the Layout editor, Master form, Triggers, Data Navigation Via an Oracle form, Master detail form, Creating a master detail form, Master detail data entry screen.
UNIT V:

Working with reports, Defining a data model for report, specific the layout of a report, use the Oracle reports interface, Creating a default tabular report, Creating computed columns, Creating user parameter, Arranging the layout, Creating a Master / Detail report, Creating a matrix report.

TEXT BOOK:

For units 2, 3, 4, 5, treatment as in ‘Commercial application Development using Oracle developer 2000’ by IVAN BAYROSS.


REFERENCE:

1. Alex Leen and Mathews Leon, “Database Management Systems” - Vikas publications

RDBMS PRACTICAL LIST:

1. Creating tables and writing simple queries using
   a) Comparison operators
   b) Logical Operators
   c) Set operators
   d) Sorting and Grouping
2. Writing Queries using built in functions
3. Creation of reports using column format
4. Updating and altering tables using SQL
5. Creation of students information table and write PL/SQL blocks find the total, average marks and results
6. Write a PL/SQL block to prepare the electricity bill
7. Write a PL/SQL to split the students information table in to two, one with the passed and other with failed
8. Write PL/SQL block to join two tables, first table contains the Roll no. and address.
9. Create a Database Trigger to check the data validity of record.
Skill Based Subject - Semester IV

Subject title: Operations Research – Paper II

Credit hours: 3

Subject Description:
This course gives emphasis to enhance student knowledge in game theory, performance measures of queues, optimal use of Inventory and Network scheduling with application.

Unit I:
Game Theory – Two person zero sum game – The Maxmini – Minimax principle – problems - Solution of 2 x 2 rectangular Games – Domination Property – (2 x n) and (m x 2) graphical method – Problems.

Unit II:
Queueing Theory – Introduction – Queueing system – Characteristics of Queueing system – symbols and Notation – Classifications of queues – Problems in (M/M/1) : (∞/FIFO); (M/M/1) : (N/FIFO); (M/M/C) : (∞/FIFO); (M/M/C) : (N/FIFO) Models.

Unit III:
Inventory control – Types of inventories – Inventory costs – EOQ Problem with no shortages – Production problem with no shortages – EOQ with shortages – Production problem with shortages – EOQ with price breaks.

Unit IV:

Unit V:
PERT – PERT calculations – Cost Analysis – Crashing the Network – Problems.

References:
Semester: V  Core Paper – XII

Subject Title: Real Analysis  Credit Hour:5

Subject Description:
This course focuses on the Real and Complex number systems, set theory, point set topology and metric spaces.

Goal:
To introduce the concepts which provide a strong base to understand and analysis mathematics.

Objective:
On successful completion of this course the students should gain the knowledge about real and complex numbers, sets and metric space.

UNIT I
Least upper bound, greatest lowest bound- the Cauchy schewarz inequalities – Countable and uncountable sets- Uncountability of the real number systems- Set Algebra – Countable collections of countable sets.

Elements of point set topology: Euclidean space $\mathbb{R}^n$ –open balls and open sets in $\mathbb{R}^n$. The structure of open Sets in $\mathbb{R}^n$ –closed sets and adherent points –The Bolzano –Weierstrass theorem –the Cantor intersection Theorem.

UNIT II

UNIT III

UNIT IV
Definition of derivative –Derivative and continuity –Algebra of derivatives –Roll’s theorem –The mean value theorem for derivatives –Taylor’s formula with remainder. Properties of monotonic functions –functions of bounded variation –total Variation –additive properties of total variation on $(a, x)$ as a function of $x$ – functions of bounded variation expressed as the difference of increasing functions –continuous functions of bounded variation.

UNIT V
Treatment as in

References

Group A: Semester: V Core Paper –XIII

Subject title: Modern Algebra Credit hours: 5

Subject description:
This course provides knowledge about sets, mappings, different types of groups and rings.

Goals:
To enable the students to understand the concepts of sets, groups and rings. Also the mappings on sets, groups and rings.

Objective:
On successful completion of course the students should have concrete knowledge about the abstract thinking like sets, groups and rings by proving theorems.

UNIT I
Sets – mappings – Relations and binary operations – Groups: Abelian group, Symmetric group Definitions and Examples – Basic properties.

UNIT II

UNIT III
Homomorphisms – Cauchy’s theorem for Abelian groups – Sylow’s theorem for Abelian groups Automorphisms – Inner automorphism - Cayley’s theorem, permutation groups.

UNIT IV
Rings: Definition and Examples –Some Special Classes of Rings – Commutative ring – Field – Integral domain - Homomorphisms of Rings.

UNIT V
Ideals and Quotient Rings – More Ideals and Quotient Rings – Maximal ideal - The field of Quotients of an Integral Domain
Treatment as in


Unit I
Chapter 1 Sections 1.1 to 1.3
Chapter 2 Sections 2.1 to 2.3

Unit II
Chapter 2 Sections 2.4 to 2.6

Unit III
Chapter 2 Sections 2.7 to 2.10

Unit IV
Chapter 3 Sections 3.1 to 3.3

Unit V
Chapter 3 Sections 3.4 to 3.6.

References

Semester: V   Core Paper –XIV

Subject Title: VISUAL BASIC   Credit hours: 5

UNIT I:

UNIT II:
Branching and looping- logical operators – If-then, If-then-Else, Select case- For Next, Do loop. While-Wend, Stop- VB control functions – Forms and controls.

UNIT III:
Menus and dialog boxes: Bulinding Drop down menus, Accessing menu-sub menus- Popup menus- dialog boxes.
Executing and debugging a new project- Errors-Error handlers.

UNIT IV:
Procedures: Modulus and procedures- sub procedures- Event procedures-Function procedures.
Arrays : Characteristics-Declarations- Dynamic Arrays- Control arrays.

UNIT V:
Data Files: Characteristics-accessing and saving a file in VB –processing- Sequential Data file- Random access file-Binary files.

Treatment as in Byron S Goutfield ,”VB” ,schamn’s outlines ,TMH Edition-2002

VISUAL BASIC LIST OF PRACTICALS

1. In VB, create a project that displays the current data and time. Use VB variable Now and the Format Library function.

Write a program
2. To enter and display text. Use text box and command button.
3. To convert temperature from Fahrenheit to centigrade or vice-versa
4. To select any one from a list. Use combo box to display choices.
5. To calculate factorial of a given number.
6. To illustrate the usage of Timer control.
7. To illustrate the usage of scroll bars.
8. To illustrate the usage of Drop down menus.
9. To illustrate the usage of menu enhancement.
10. To illustrate the usage of Pop-up menu.
11. To illustrate the usage of input boxes.
12. To find smallest of n numbers.
13. To find the sine of angle.
14. To sort list of numbers.
15. To determine deviations about an average.

Semester: V Core Paper XV

Subject Title: DISCRETE MATHEMATICS Credit Hours: 6

Subject Description: This course focuses on the mathematical logic, Relations & Functions, Formal languages and Automata, Lattices and Boolean Algebra and Graph Theories.

Goal: To enable the students to learn about the interesting branches of Mathematics.

Objectives: On successful completion of this course should gain knowledge about the Formal languages Automata Theory, Lattices & Boolean Algebra and Graph Theory.

UNIT-I:
Mathematical logic: Connections well formed formulas, Tautology, Equivalence of formulas, Tautological implications, Duality law, Normal forms, Predicates, Variables, Quantifiers, Free and bound Variables. Theory of inference for predicate calculuses. (1-2.7.1-2.9, 1-2.10, 1-2.11, 1-3, 1-5.1, 1-5.2, 1-5.4, 1-6.4)

UNIT-II:
Relations and functions: Composition of relations, Composition of functions, Inverse functions, one-to-one, onto, one-to-one & onto, onto functions, Hashing functions, Permutation function, Growth of functions. Algebra structures: Semi groups, Free semi groups, Monoids, Groups, Cosets, Sets, Normal subgroups, Homomorphism. (2-3.5, 2-3.7, 2-4.2, 2-4.3, 2-4.6, 3-2, 3-5, 3-5.3, 3-5.4)

UNIT-III:
UNIT-IV:
Lattices and Boolean algebra: Partial ordering, Poset, Lattices, Boolean algebra, Boolean functions, Theorems, Minimization of Boolean functions. (4-1.1, 4-2, 4-3, 4-4.2)

UNIT-V:
Graph Theories: Directed and undirected graphs, Paths, Reachability, Connectedness, Matric representation, Eular paths, Hamiltonian paths, Trees, Binary trees simple theorems, and applications. (5-1.1, 5-1.2, 5-1.3, 5-1.4)

Text Books:
Reference Books:
1. Discrete maths by N. C.h S. Iyengar and others
2. Discrete maths by J.K. Sharma
3. Graph theory for computer science and Engineers by Narsingh Deo

Skill Based Subject : Semester V

Subject title: Operations Research – Paper III Credit hours: 3

Subject Description:
This course presents applications and method to solve Integer Programming Problems, Non-linear Programming Problems and Dynamic Programming problems. It also includes Markov Analysis and Decision Analysis.

Unit I:
Integer Programming Problem – Gromory’s fractional cut Method – Branch Boud Method.

Unit II:

Unit III:

Unit IV:
Markov Analysis – Stochastic process – Markov analysis Algorithm.

Unit V:
References:

Semester: VI  Core Paper –XVI
Subject Title: Complex Analysis  Credit Hours:5

Subject Description:
This course provides the knowledge about complex number system and complex functions.

Goal:
To enable the students to learn complex number system, complex function and complex integration.

Objectives:
On successful completion of this course the students should gained knowledge about the origin, properties and application of complex numbers and complex functions.

UNIT –I
Analytic function C-R equation – Sufficient condition – Harnomic functions.

UNIT-II
Biliner transformation – Cross Ratio – Fixed Points – Transformation which map real axis to real axis – Unit circle to unit circle – real axis to unit circle.

UNIT –III
Complex integration- Cauchy’s Integral Theorem – Cauchy’s Integral formula – Derivatives of analytic function – Moreras Theorem – Cauchy’s inequality – Liouville’s Theorem – Fundamental Theorem of Algebra.

UNIT-IV

UNIT-V

Prescribed Tex Book
“Complex Analysis” by Durai Pandian& Laxmi Durai Pandian - Emerald Publications.

References
Semester: VI  Core Paper –XVII

**Subject title:** INTERNET AND JAVA  
**Credit hours:** 5

**Subject description:**
This paper presents the introduction to internet, ISP, mail, web, URLs, schemes, browser, HTML, Usenet, Gopher, veronica, Jug head, Anonymous ftp, archie, telnet, talk, IRC and muds, Java introduction, data types, operators, statements, class, packages, interfaces, exception handling, threads, applets and AWTS.

**Goals:**
To enable the students to study about internet, mail, web, HTML, Usenet, Gopher, veronica, Jug head, Archie and Java fundamentals, class, packages, exception handling, threads, applets and AWTS.

**Objectives:**
On successful completion of the course the students should have:
- Learnt the basic concept of internet, mailing, HTML, Archie, telnet, ftp and IRC muds.
- Learnt about Java fundamentals, operators and statements.
- Learnt the concept of packages, interfaces and exception handling.
- Learnt the concept of threads, applets and AWTS.

**UNIT I:**
Introduction to Internet- Resources of Internet -hardware and software requirements of internet- Internet service providers (ISP)-Internet addressing- Mail Using mail from a shell account - Introduction to web- using the web.

**UNIT II:**
URLs, schemes host names and port numbers- Using the browser Hypertext and HTML- Using the web from a shell account Introduction to Usenet - Reading and posting Usenet articles- Using Usenet from a shell account- Gopher ,Veronica and Jug head- Using gopher from a shell account.

**UNIT III:**

**UNIT IV:**
Features of java - java environment - comparing java with C++ - introduction to java language -types - operators - flow control - classes - packages and interfaces.

**UNIT V:**
Java classes - string handling- exception handling - threads and synchronization - utilities - input / output - networking - applets - abstrct windows toolkit (AWT)-imaging.

**Text book:**
ELECTIVE I - A

SUBJECT TITLE: ASTRONOMY – I

CREDIT HOURS: 6

**Subject Description:** This course focuses on the Solar system, Celestial sphere, Dip-Twilight

**Goal:** To enable the students to understand the Astronomical aspects and about the laws governing the planet movements.

**Objectives:** On successful completion of this course the students should gain knowledge about Astronomy.

**UNIT I:**

**UNIT II:**
Celestial sphere – Celestial co – ordinates – Diurnal motion – Variation in length of the day.

**UNIT III:**
Dip – Twilight – Geocentric parallax.

**UNIT IV:**
Refration – Tangent formula – Cassinis formula.

**UNIT V:**
Kepler’s laws – Relation between true eccentric and mean amomalies.

Treatment as in “ASTRONOMY” by S.Kumaravelu and Susheela Kumaravelu.

Question paper setters to confine to the above text book only.
SUBJECT TITLE: Numerical Methods –I

CREDIT HOURS: 6

Subject Description: This course presents method to solve linear algebraic and transcendental equations and system of linear equations. Also Interpolation by using finite difference formulae.

Goal: It exposes the students to study numerical techniques as powerful tool in scientific computing.

Objective: On successful completion of this course the student gain the knowledge about solving the linear equations numerically and finding interpolation by using difference formulae.

Unit I: The solution of numerical algebraic and transcendental Equations:

Unit II: Solution of simultaneous linear algebraic equations:

Unit III: Finite Differences:

Unit IV: Interpolation (for equal intervals):
   Newton’s forward and backward formulae – equidistant terms with one or more missing values – Central differences and central difference table – Gauss forward and backward formulae – Stirlings formula.

Unit V: Interpolation (for unequal intervals):
   Divided differences – Properties – Relations between divided differences and forward differences – Newton’s divided differences formula – Lagrange’s formula and inverse interpolation.

Treatment as in

References:
ELECTIVE I - C

Subject Title: GRAPH THEORY

Credit Hours-6

Subject Description:
This course focuses on the Graphs, Sub Graphs, Trees, Planar graphs, Directed graphs. It also deals about matrix representation of Graphs.

Goal: To enable the students to understand the basic concepts of Graph Theory.

Objectives:
On successful completion of this course the students should gain knowledge about Graph Theory.

UNIT I:

UNIT II:

UNIT III:
Matrix representation of a graph – vector spaces, associated with a graph – cycle spaces and act set spaces.

UNIT IV:
Planar graphs – Enter’s theorem on planar graphs – characterization of planar graphs (no proofs) of the difficult part of the characterization.

UNIT V:
Directed graphs – Connectivity – Entorion Digraphs – Tournaments.
Treatment as in “A First Course in Graph Theory” by A.Chandran (Macmillan) Chapters 1 to 7.

Books for References:
1. Narasingh Deo, “Graph Theory” (Prentice Hall of India).
ELECTIVE II - A  
Semester: VI

Subject Title: ASTRONOMY II  
Credit Hours -6

Subject Description:  
This course focuses on the Time, Annual Parallax, Precession, Nutation and The Moon, Eclipses.

Goal:  
To enable the students to learn about the interesting facts of Moon, Sun Planetary Motion.

Objectives:  
On successful completion of this course the students should gain knowledge about Astronomy.

UNIT-I:  
Time: Equation of time – Convertion of time – Seasons – Calendar.

UNIT-II:  
Annual Parallax – Abberation.

UNIT-III:  
Precession – Nutation.

UNIT-IV:  
The Moon – Eclipses.

UNIT-V:  
Planetary Phenomenon – The Stellar system.

Treatment as in “ASTRONOMY” by Mr.S.Kumaravelu and Susheela Kumaravelu.  
Question paper setters to confine to the above text book only.
ELECTIVE II - B

SUBJECT TITLE: NUMERICAL METHODS- II  CREDIT HOURS: 6

Subject Description: This course presents Numerical differentiation, Numerical integration and method to solve the differential equations.

Goal: It exposes the students to study numerical techniques as powerful tool in scientific computing.

Objective: On successful completion of this course the student gain the knowledge about solving the linear equations numerically and finding interpolation by using difference formulae.

Unit I: Numerical differentiations:
Newton’s forward and backward formulae to compute the derivatives – Derivative using Stirlings formulae – to find maxima and minima of the function given the tabular values.

Unit II: Numerical Integration:
Newton – Cote’s formula – Trapezoidal rule – Simpson’s 1/3rd and 3/8th rules – Gaiassian quadrature
– two points and three points formulae

Unit III: Difference Equation:
Order and degree of a difference equation – solving homogeneous and non–homogeneous
linear difference equations.

Unit IV:
Taylor series method – Euler’s method – improved and modified Euler method – Runge Kutta method(fourth order Runge Kutta method only)

Unit V: Numerical solution of O.D.E(for first order only):
Milne’s predictor corrector formulae – Adam-Bashforth predictor corrector formulae
– solution of ordinary differential equations by finite difference method (for second order O.D.E).

Treatment as in
(Chapters: 9,10,11, Appendix and Appendix E).

References:
ELECTIVE II - C

SUBJECT TITLE: DIGITAL ELECTRONICS AND COMPUTER FUNDAMENTALS

UNIT-I

UNIT-II

UNIT-III

UNIT-IV

UNIT-V

TEXT BOOK:
1. Digital Principles and Applications by Albert Malvino and Donald P Leach
2. Digital Computer fundamentals by T.C.Bartee.

REFERENCE:
Digital Circuits and Design by S. Salivaganan and S. Arivalagan.

ELECTIVE III - A

SUBJECT TITLE: AUTOMATA THEORY AND FORMAL LANGUAGES
CREDIT HOURS: 6

UNIT – I
   Introduction – phrase structure languages.

UNIT – II
   Closure operations.
UNIT – III
Context free languages.

UNIT – IV
Finite state automata.

UNIT – V
Push down automata.

Content and treatment as in, ‘Formal Languages and Automata’ by Rani Sriomoney. Revised edition 1984. Published by the Christian Literary Society, Madras-3 Chapters 1 to 6.

Reference Books:
1. Hopcroft and stillman - Formal languages and their relation automata - Addison Wesley.

ELECTIVE III - B
FUZZY LOGIC AND NEURAL NETWORKS

Objectives
- to introduce the concept of soft computing to the students.
- to take up research projects in these areas.
- to enable the students to apply the soft computing methodologies in their fields of work

Fuzzy Logic

Unit I

Unit II

Unit III
Neural Networks

Unit IV  

Unit V  

Treatment as in  

Unit I: Chapter 6  
Unit II: Chapter 7  
Unit III: Chapter 14  
Unit IV: Chapter 2  
Unit V: Chapter 3( Sections 3.1,3.2)

Reference