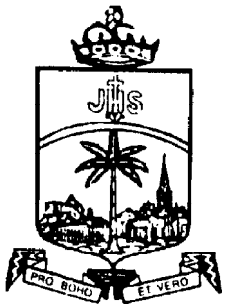
M.Sc. MATHEMATICS

SYLLABUS: 2010-2012

CHOICE BASED CREDIT SYSTEM
(CBCS)



St. JOSEPH'S COLLEGE (Autonomous)

Re-accredited with A⁺ Grade by NAAC

College with Potential for Excellence by UGC

TIRUCHIRAPPALLI - 620 002, INDIA

FEATURES OF CHOICE BASED CREDIT SYSTEM

PG COURSES

The Autonomous (1978) St. Joseph's College, Reaccredited with A+ Grade from NAAC (2006), had introduced the Choice Based Credit System (CBCS) for PG courses from the academic year 2001 – 2002. As per the guidelines of Tamil Nadu State Council of Higher Education (TANSCHE) and the Bharathidasan University, the College has reformulated the CBCS in 2008 – 2009 by incorporating the uniqueness and integrity of the college.

OBJECTIVES OF THE CREDIT SYSTEM

- To provide mobility and flexibility for students within and outside the parent department as well as to migrate between institutions
- To provide broad-based education
- To help students learn at their own pace
- To provide students scope for acquiring extra credits
- To impart more job oriented skills to students
- To make any course multi-disciplinary in approach

What is credit system?

Weightage to a course is given in relation to the hours assigned for the course. Generally one hour per week has one credit. For viability and conformity to the guidelines credits are awarded irrespective of the teaching hours. The following Table shows the relation between credits and hours.

Sem.	Specification	No. of Papers	Hour	Credit	Total Credits
I – IV	Core Courses (Theory & Practical)	14	6	14 x 5	70
	Project	1	--	1 x 5	Additional
I – IV	3 – Core Electives	3	4	3 x 4	12
	2 – Inter Dept. Courses (IDC)	2	4	2 x 4	08
I – IV	SHEPHERD – Extension Activity	~	70	5	Additional

Total Minimum Credits	90
Total Additional Credits (Compulsory)	10
Other Additional Credits (Dept. Specific)	....

However, there could be some flexibility because of practical, field visits, tutorials and nature of project work.

For PG courses a student must earn a minimum of 90 credits and 10 compulsory credits as mentioned in the above table. The total number of courses offered by a department is 20. However within their working hours a few departments can offer extra credit courses.

Course Pattern

The Post Graduate degree course consists of three major components. They are Core Course, Elective Course and Inter Department Course (IDC) . Also 2 compulsory components namely Project / Project related items and Shepherd, the extension components are mandatory.

Core Course

A core course is the course offered by the parent department, totally related to the major subject, components like Practical, Projects, Group Discussion, Viva, Field Visit, Library record form part of the core course.

Elective Course

The course is also offered by the parent department. The objective is to provide choice and flexibility within the department. The student can choose his/her elective paper. Elective is related to the major subject. The difference between core course and elective course is that there is choice for the student. The department is at liberty to offer three elective courses any semester. It must be offered at least in two different semesters. The Staff too may experiment with diverse courses.

Inter Department Course (IDC)

IDC is an inter departmental course offered by a department for the students belonging to other departments. The objective is to provide mobility and flexibility outside the parent department. This is introduced to make every course multi-disciplinary in nature. It is to be chosen from a list of courses offered by various departments. The list is given at the end of the syllabus copies. Two IDC s must be taken by students which are offered in Semester II & III.

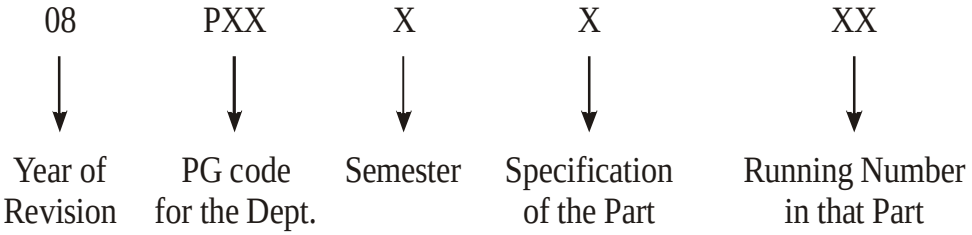
Day College (Shift-I) student may also take an IDC from SFS (Shift-II) course and vice versa

This provision enables students to earn extra credits. For the Shift – I students it is offered in their last hour and for the Shift-II

(Course) students in their first hour. The IDC are of application oriented and inter-disciplinary in nature.

Subject Code Fixation

The following code system (9 characters) is adopted for Post Graduate courses:



01 – Core Courses: Theory & Practical
02 – Core electives
03 – Additional Core Papers (if any)
04 – Inter Departmental Courses
05 – Project (compulsory)
06 – Shepherd (compulsory

CIA Components

The CIA Components would comprise of two parts: (1) Test Components conducted by Controller of Examination (COE) and (2) Teacher specific component. The two centralized tests will be conducted by the COE (Mid-Semester Test & End-Semester Test) for 30% each administered for 1 hour and 30 minutes duration. The remaining 40% would comprise of any four components as listed below and will be carried out by the faculty concerned for that paper.

- Assignment, Quiz (Written / Objective), Snap test, Viva-Voce, Seminar, Listening Comprehension, Reading Comprehension, Problem Solving, Map Reading, Group Discussion, Panel Discussion, Field Visit, Creative Writing, Open Book Test, Library Record, Case Study.
- As a special consideration, students who publish papers in referred journals would be exempted from one of the teacher specific internal components in one of the papers. At the beginning of each semester, the four internal components would be informed to the students and the staff will administer those components on the date specified and the marks acquired for the same will be forwarded to the Office of COE.

Question Pattern

Pattern	Mid & End Semester Test	Semester Exam
Part A : No Choice	3 x 2 = 06	10 x 2 = 20
Part B : Either/or type	3 x 4 = 12	5 x 7 = 35
Part C : Comprehensive	(2/3)2 x 6 = 12	(3/5)3 x 15 = 40
	Total = 30	Total = 100

Evaluation

For each course there are formative continuous internal assessment (CIA) and semester examinations (SE) in the weightage ratio 50:50. Once the marks of CIA and SE for each course are available, the Overall Percentage Mark (OPM) for a student in the programme will be calculated as shown below:

$$OPM = \frac{\sum_i C_i M_i}{\sum_i C_i}$$ where Ci is the credit earned for that course in any semester and Mi is the marks obtained in that course.

The Scheme of Over-all Results is as follows:

	PG	
Class	Arts (OPM)	Science (OPM)
SECOND	50 to 59.99	50 to 59.99
FIRST	60 to 74.99	60 to 79.99
DISTINCTION	75 & Above	80 & Above

The performance in Compulsory credits in Project and Project related items and in Shepherd programme is indicated by a pass and is not taken into account for computing OPM.

Declaration of Result

Mr. /Ms. _____ has successfully completed M.Sc. / M.A. degree course in _____. The student's overall average percentage of marks is _____ and has completed the minimum 90 credits. The student has acquired 10 more compulsory credits from Project and Shepherd courses. The student has also acquired _____ (if any) extra credits from courses offered by the parent department.

COURSE DETAIL

Sem	Subject Code	Title	Hrs/ Week	Credit
I	10PMA 1 1 01	Real Analysis I	6	5
	10PMA 1 1 02	Linear Algebra	6	5
	10PMA 1 1 03	Methods of Applied Mathematics	6	5
	10PMA 1 1 04	Differential Equations	6	5
	10PMA 1 1 05	Classical Dynamics	6	5
		TOTAL FOR SEMESTER I	30	25
II	10PMA 2 1 06	Real Analysis II	7	5
	10PMA 2 1 07	Algebra	7	5
	10PMA 2 1 08	Complex Analysis	6	5
	10PMA 2 1 09	Graph Theory	6	5
	10PMA 2 4 01	IDC -OR	4	4
		TOTAL FOR SEMESTER II	30	24
III	10PMA 3 1 10	Topology	7	5
	10PMA 3 1 11	Measure and Integration	7	5
	10PMA 3 1 12	Stochastic Process	7	5
	10PMA 3 2 01A	Elective: Differential Geometry/or		
	10PMA 3 2 01B	Design and Analysis of Algorithms	4	4
	10PMA 2 4 01	IDC-Numerical Methods	4	4
		TOTAL FOR SEMESTER III	29	23
IV	10PMA 4 1 13	Functional Analysis	7	5
	10PMA 4 1 14	Fluid Dynamics	7	5
	10PMA 4 2 02A	Elective: Automata Theory/or		
	10PMA 4 2 02B	Java Programming	4	4
	10PMA 4 2 03A	Elective: Algebraic Number Theory/or		
	10PMA 4 2 03B	Optimization Techniques	4	4
	10PMA 4 5 01	Project Work	8	5
		TOTAL FOR SEMESTER IV	30	23
II-III	10PMA 4 6 02	Shepherd		5
	TOTAL CREDIT FOR ALL SEMESTERS			100

Sem I Hours/Week: 6
10PMA1101 Credits: 5

REAL ANALYSIS – I

Objectives :

1. To give the students a thorough knowledge of the various aspects of Real line and Metric Spaces which is imperative for any advanced learning in Pure Mathematics.
2. To train the students in problem-solving as a preparatory to NET/SLET.

Note: The Question Paper may contain problems to a maximum of 20%

Unit-I: The Real and Complex Number Systems (15 Hrs)

Introduction- Ordered Sets – Fields – The Real Field – The Extended Real Number System – The Complex Field – Euclidean Spaces .(Chapter 1)

Unit – II : Basic Topology (15 Hrs)

Finite , countable and uncountable Sets – Metric Spaces – Compact Sets – Perfect Sets - Connected Sets .(Chapter 2)

Unit - III : Numerical Sequences and Series (15 Hrs)

Convergent Sequences – Subsequences – Cauchy Sequences – Upper and Lower Limits –Some Special Sequences – Series– Series of non-negative terms – the number'e'.
(Chapter 3 – 3.1 to 3.32)

Unit – IV : Convergence of Series (15 Hrs)

The Root and Ratio Tests - Power Series – Summation by parts – Absolute convergence – Addition and Multiplication of Series – Rearrangements. (Chapter 3 – 3.33 to 3.55)

Unit – V: Continuity (15 Hrs)

Limits of Functions – Continuous functions – Continuity and Compactness – Continuity and Connectedness – Discontinuities – Monotonic functions – Infinite Limits and Limits at Infinity. (Chapter 4)

Book for Study:

Walter Rudin – Principles of Mathematical Analysis (Third Edition) McGraw-Hill International Book Company, New York .

Books for Reference:

1. Topology of Metric Spaces – Dr. S.Kumaresan – Narosa Publications
2. Tom Apostol – Mathematical Analysis – Addison Wesley Publishing Company London – 1971

Sem I Hours/Week: 6
10PMA1102 Credits: 5

LINEAR ALGEBRA

Objectives :

1. To give the students a thorough knowledge of the various aspects of linear Algebra
2. To train the students in problem-solving as a preparatory to NET/SLET

UNIT I (15 Hrs)

Systems of linear Equations – Matrices and Elementary Row operations – Row - Reduced echelon Matrices – Matrix Multiplication – Invertible Matrices – Vector spaces – Subspaces – Bases and Dimension – Computations concerning Subspaces(Chapters 1 and 2)

UNIT II (15 Hrs)

The algebra of linear transformations – Isomorphism of Vector Spaces – Representations of Linear Transformations by Matrices - Linear Functionals - The Double Dual – The Transpose of a Linear Transformation. (Chapter 3)

UNIT III (15 Hrs)

The algebra of polynomials – Lagrange Interpolation – Polynomial Ideals – The prime factorization of a polynomial, Commutative rings – Determinant functions – Permutations and the uniqueness of determinants – Classical Adjoint of a (Square) matrix – Inverse of an invertible matrix using determinants. (Chapter 4: and Chapter 5: Sections 5.1 to 5.4)

UNIT IV (15 Hrs)

Characteristic values – Annihilating polynomials - Invariant subspaces - Simultaneous triangulation and simultaneous Diagonalization (Chapter 6: Sections 6.1 to 6.5)

UNIT V (15 Hrs)

Direct-sum Decompositions – Invariant Direct sums – Primary Decomposition theorem. (Chapter 6 Sections 6.6 to 6.8)

TEXT BOOK

Kenneth Hoffman and Ray Kunze, Linear Algebra, Second Edition, Prentice – Hall of India Private Limited, New Delhi ,1975.

REFERENCE(S)

1. S. Kumaresan, Linear Algebra, Prentice-Hall of India Ltd, 2000.
2. V. Krishnamurthy et al, Introduction to Linear Algebra, East West Press Ltd, 1985.
3. A.R. Rao, P. Bhimashankaram, Linear Algebra, Tata McGraw Hill, 1996.
4. W. Curtis, Linear Algebra : an introductory approach, Springer Verlag, 1984.
5. I.N. Herstein, Topics in Algebra, Wiley Eastern Limited, New Delhi, 1975.
6. M.Artin, Algebra, Prentice Hall of India, New Delhi, 1994.

Sem I Hours/Week: 6
10PMA1103 Credits: 5

METHODS OF APPLIED MATHEMATICS

Objectives:

1. To provide applications of Euler's equation, integral transforms and integral equations in solving certain intrinsic problems in other fields such as Mechanics, Fluid Geometry etc.
2. To design mathematical models using integral equations etc.

Unit – I Variational Problems (15 Hrs)

Maxima and Minima - The simplest case - Illustrative examples including Geodesics - Natural boundary conditions and transition conditions - The variational notation.
(Sections 2.1 - 2.5)

Unit - II Applications (15 Hrs)

General case - Constraints and Lagrange multipliers - Variable end points - Sturm Liouville problem - Rayleigh Ritz method.
(Sections 2.6 - 2.9, 2.19)

Unit-III Hilbert Schmidt Theory (15 Hrs)

Introduction - Relation between differential and integral equations - Fredholm's equation with separable kernels - Illustrative examples - Hilbbert - Schmidt theory - Iterative methods - Neumann series. (Sections 3.1, 3.2, 3.6 - 3.10)

Unit - IV Fredholm Theory (15 Hrs)

Fredholm theory - Singular integral equations - Special devices; Approximation of Fredholm equation by sets of algebraic equation, Approximation of the kernal. (Sections 3.11 - 3.13, 3.15, 3.20)

Unit - V Fourier Transform (15 Hrs)

Fourier's integral theorem - Fourier transforms - Cosine transforms - Sine transforms - Transforms of derivatives - Transforms of some special functions - The Convolution integral- Parseval's theorem for Cosine and Sine transform. (Sections 2.2 - 2.7, 2.9 - 2.10)

BOOKS FOR STUDY

1. Francis B.Hildebrand:Methods of Applied Mathematics, (Second Edition) (For Units I to IV).
2. Ian N. Sneddon, The use of Integral Transforms (For unit V)

BOOKS FOR REFERENCE

1. Irving, J. and Mullineuk, N.: Mathematics in Physics and Engineering.
2. Venkataraman, M.K.: Higher Mathematics for Engineering and Science.

Sem I Hours/Week: 6
10PMA1104 Credit: 5

DIFFERENTIAL EQUATIONS

Objectives:

1. To give an in depth knowledge of solving differential equations that we encounter frequently in various walks of life
2. To introduce existence and uniqueness theorems in Differential equations.

Unit I Solution in power series (15 Hrs)

Legendre Equation and Legendre polynomials-Bessel Equation when the index is not an integer - Properties of Bessel functions. (Chapter 3, Sections 3.3, 3.4(Relevant portions only), 3.5)

Unit II Existence Theorems (15 Hrs)

Existence and uniqueness theorem-Fundamental matrix - Gronwell Inequality-Successive Approximations - Picard's Theorem-Some examples. (Chapter 4, Sections 4.4, 4.5, Chapter 5, Sections 5.1 to 5.5)

Unit III Boundary Value Problems (15 Hrs)

Sturm - Liouville problem - Green's Function - Sturm's comparison theorem. (Chapter 7, Sections 7.2, 7.3, Chapter 8, Section 8.2)

Unit IV First Order Partial Differential Equations (15 Hrs)

Partial Differential Equations-Origins of partial Differential Equations-Integral surfaces passing through a given curve-Surfaces orthogonal to a given system of surfaces-Non Linear Partial Differential Equations of the first order-Compatible Systems of First order Equations - Charpit's Method-Special types of first order equation (Chapter 2, Sections 1, 2, 5, 6, 7, 8, 9, 10, 11)

Unit V Second Order Partial Differential Equations (15 Hrs)

Origin of second order equation-Higher Partial Differential Equations with constant coefficients-Equations with variable coefficients reducible to Elliptic, Parabolic and hyperbolic forms-Problems. (Chapter 3, Sections 1, 4, 5)

BOOK FOR STUDY:

1. S.G.Deo, Lakshmikanthan, V.Raghavendra Ordinary Differential Equations- Second Edition
2. Ian.N.Snedden,Elements of Partial Differential Equations

BOOKS FOR REFERENCE:

1. Birkhoff & Rora, Ordinary Differential Equations
2. John.F, Partial Differential Equations (3rd Edition) Narosa 1979.

Sem I Hours/week: 6
10PMA1105 Credit: 5

CLASSICAL DYNAMICS

Objective:

1. To give a details knowledge about the mechanical system of particles, applications of Lagrange's equations and Hamilton's equations as well as the theory of Hamilton Jacobi Theory.

Unit -I Introductory Concept (15 Hrs)

The mechanicals system – Generalized coordinates – Constraints – Virtual work – Energy and momentum. (Chapter I: Sections 1.1 to 1.5)

Unit -II Lagrange's Equations (15 Hrs)

Derivation of Lagrange's equations – examples - Integrals of motion. (Chapter II: Sections 2.1 to 2.3)

Unit III Specials Applications of Lagrange's Equations(15 Hrs)

Rayleigh's Dissipation function - Impulsive motion – Velocity dependent potentials. (Chapter III: Sections 3.1, 3.2 & 3.4)

Unit-IV Hamilton's Equations (15 Hrs)

Hamilton's principle, Hamilton equations, other variational principles. (Chapter IV, Sections 4.1 to 4.3)

Unit-V Hamilton – Jacobi Theory (15 Hrs)

Hamilton's Principal function – The Hamilton – Jacobi equation, separability. (Chapter V, Sections 5.1 to 5.3)

BOOK FOR STUDY

Donald T. Greenwood : Classical Dynamics (Prentice Hall of India Pvt. Ltd, New Delhi 110001)

BOOKS FOR REFERENCE

1. Herbert Goldstrein : Classical Mechanics.

2. John L.Synge & Byron A. Griffth: Principles of Mechanics.

Sem - II Hours/Week: 6
10PMA2106 Credit : 5

REAL ANALYSIS - II

Objectives:

1. To give the students a thorough knowledge of the various aspects of Real Line and Metric spaces in general which is imperative for any advanced learning.
2. To introduce a complete Topological approach in all aspects of Analysis and make them to solve problems.

Note: Question paper may contain maximum of 20% problems

Unit-I : Differentiation (15 Hrs)

The Derivative of a Real Function - Mean Value Theorems - The Continuity of Derivatives - L'Hospital's Rule
(Chapter 5, Sections 5.1 to 5.13)

Unit-II : Differentiation and Integration (15 Hrs)

Derivatives of Higher Order - Taylor's Theorem – Differentiation of Vector – valuedFunctions – Definition and Existence of the Integral. (Chapter 5, Sections 5.14 to chapter 6, sections 6.11)

Unit-III: R-S Integral (15 Hrs)

Properties of the integral - Integration and Differentiation – Integration of Vector – valued functions – Rectifiable curves.
(Chapter 6, Sections 6.12 to 6.27)

Unit-IV: Sequence and Series of Functions (15 Hrs)

Discussion of Main Problem-Uniform Convergence-Uniform Convergence and Continuity-Uniform Convergence and Integration-Uniform Convergence and Differentiation
(Chapter 7, Sections 7.1 to 7.18)

Unit-V: Functions of Several Variables (15 Hrs)

Linear Transformations – Differentiation – The contraction Principle – The inverse Function Theorem – The Implicit Function Theorem – The Rank Theorem. (Chapter 9, Sections 9.1 to 9.32)

BOOK FOR STUDY

Walter Rudin: Principals of Mathematical Analysis (THIRD Edition), McGraw-Hill International Book Company, New York.

BOOKS FOR REFERENCE

1. Apostol: Mathematical Analysis, Addison-Wesley Publishing Company, London, 1971.
2. Goldberg: Methods of Real Analysis, Oxford & IBH Publishing Company.

Sem II Hours/Week: 7
10PMA 2107 Credit : 5

ALGEBRA

Objectives:

1. To give foundation in group theory
2. To train the students in problem-solving as a preparatory to NET/SLET.

Unit I (15 Hrs)

Normal subgroups and Quotient groups-Homomorphism-Conjugacy-Sylow's theorem. (Chapter 2: 2.6, 2.7, 2.11 and 2.12)

Unit II (15 Hrs)

Ideals and quotient rings- More Ideals and quotient rings – Euclidean rings- A particular Euclidean ring. (Chapter 3: 3.4, 3.5, 3.7 and 3.8)

Unit III (15 Hrs)

Polynomial Rings – Polynomials over the Rational Field-Polynomial Rings over commutative rings. (Chapter 3: 3.9, 3.10 and 3.11)

Unit IV (15 Hrs)

Field Extension – Extension fiends, Roots of Polynomials more about roots. (Chapter 5: sec 5.1, 5.3, 5.5)

Unit V (15 Hrs)

The elements of Galois Theory – bounded on the size of G (k, F) – Fundamental theorem of Galois theory-Finite Fields. (Chapter5: 5.6 and Chapter 7: 7.1)

BOOK FOR STUDY

Herstein.I.N. Topics in Algebra 2nd edition JOHN WILEY &SONS

BOOKS FOR REFERENCE

1.Sergi Lang – Algebra.

2.Gopala Krishnan – University Algebra.

Sem-II Hours/Week:6
10PMA2108 Credit: 6

COMPLEX ANALYSIS

Objectives:

1. To explain the various intrinsic concepts and theories of Complex Analysis.
2. To study the concept of Analyticity, Complex Integration and Infinite Products in depth.

UNIT I - Fundamental Theorems (15 Hrs)

Line Integrals- Rectifiable arcs-Line integrals as Functions of Arcs- Cauchy's Theorem for Rectangle – Cauchy's Theorem in a Disk. (Chapter:4 sections 1.1-1.5 Pages 101-114)

UNIT II - Cauchy's Integral Formula (15 Hrs)

The incex of a point with respect to a closed curve – The integral formula- Higher Derivatives- Removable Singularities- Taylor's Theorem-Zeroes and Poles (Chapter:4 sections 2.1-2.3 ,3.1-3.2 Pages 114-130)

UNIT III- Calculus of Residues (15 Hrs)

The Local mapping- the Maximum principle- The Residue theorem – The argument principle- Evaluation of Definite Integrals (Chapter:4 sections 3.3-3.4,5.1-5.3 Pages 130-137,148-161)

UNIT IV- Harmonic Functions (15 Hrs)

Definitions and Basic properities- The Mean Value Property – Poisson's Formula-Schwarz's Theorem- The Reflection Principle. (Chapter:4 sections 6.1-6.5 Pages 160-174)

UNIT V- Power Series expansion (15 Hrs)

Weierstrass's Theorem- The Taylor series –The Laurent series- Partial Fractions- infinite products.
(Chapter:5 sections 1.1-1.3, 2.1, 2.2 Pages 175-193)

TEXT BOOK:

Lars V. Ahlfors COMPLEX ANALYSIS An introduction to the theory of analytic function of one complex variable. 3rd Edition Mc Graw Hill Book Company

Reference Books:

1. Functions of one Complex Variable John B. Conway 2nd Edition; Springers International Students Edition
2. Function of complex analysis Ponnusamy. S , Narosa Publishing House.

Sem II Hours/Week: 7
10PMA2109 Credit: 5

GRAPH THEORY

Objectives:

1. To give a rigorous introduction to the basic concepts of Graph Theory
2. To give applications of Graph Theory in other disciplines.

Unit-I Basic Concepts (15 Hrs)

Basic Results-Basic Concepts-Sub graphs-Degrees of vertices-Paths and connectedness-Operations on graphs-Directed graphs: Basic Concepts-Tournaments (Chapter I, Sections 1.1 to 1.7, Chapter II, Sections 2.1 to 2.2) (Theorems,Propositions and results which are starred are to be omitted)

Unit II - Connectivity (15 Hrs)

Vertex cuts and edge cuts-connectivity and edge connectivity,Trees: Definitions, Characterization and simple properties-Counting the number of spanning trees-Cayley's formula. (Chapter III, Sections 3.1 and 3.2,Chapter IV, Sections 4.1, 4.3.1 to 4.3.3, 4.4) (Theorems,Propositions and results which are starred are to be omitted)

Unit III -Independent sets and matchings (15 Hrs)

Vertex independent sets and vertex coverings-edge independent sets - matchings and factors-Eulerian graphs-Hamiltonian graphs. (Chapter V, Sections 5.1 to 5.2, Chapter VI, Sections 6.1 , 6.2.1 to 6.2.12) (Theorems,Propositions and results which are starred are to be omitted)

Unit IV- Colouring (15 Hrs)

Graph Colourings-Vertex colouring-Critical graphs-Triangle free graphs - edge colourings of graphs-Chromatic polynomials. (Chapter VII, Sections 7.1 to 7.4, 7.7) (Theorems,Propositions and results which are starred are to be omitted)

Unit V -Planarity (15 Hrs)

Planar and non planar graphs-Euler formula and its consequences-K5 and K3,3 nonplanar graphs-Dual of a planar graph-The four- colour theorem and the five colour Theorem. (Chapter VIII, Sections 8.1 to 8.5)

Notes: Theorems,Propositions and results in the text which are starred are to be omitted.

BOOK FOR STUDY:

R.Balakrishnan & K.Ranganathan, Textbook of Graph Theory by Springer.

BOOKS FOR REFERENCE:

1. Bondy.J.A. & Murty V.S.R-Graph theory with applications – Mac Millan Press Ltd.1976
2. Arumugam. S and Ramachandran S. Invitation to Graph Theor-New Gamma Publishing house, Palayamkottai 1993

Sem II Hours/Week: 4
10PMA2401 Credit: 4

IDC: OPERATIONS RESEARCH

Objectives:

1. To enlighten the students in the field of operations research which has many applications in management techniques.
2. To help the students to find optimum solution in business management problems.

Unit I Transportation (15 Hrs)

Introduction-finding initial basic feasible solution-North-west corner rule-least cost or matrix minima method-Vogel's approximation method-moving towards optimality-unbalanced transportation problems. (Sections 6.1, 6.5, 6.6, 6.9)

Unit II Assignment (15 Hrs)

Assignment algorithm (Sections 7.3, full)

Unit III Decision analysis (15 Hrs)

Introduction-decision making environment-the maxmin or minmax criterion-the savage regret criterion-the Hurwitz criterion. (Sections 16.1 to 16.3)

Unit IV Replacement problem (15 Hrs)

Introduction- Replacement of equipment or asset deteriorating gradually- replacement of equipment that fails suddenly. Linear programming formulation and graphical method. (Sections 19.1 to 19.3, no proof of theorems, problems only, Sections 2.1 to 2.3)

Unit V Network Scheduling by PERT/CPM (15 Hrs)

Network and basic components-numbering the events-time calculations in networks-critical path method-PERT/CPM, PERT calculations. (Sections 21.2 to 21.7)

BOOK FOR STUDY

Kanti Swarup,Gupta& P.K.Man Mohan :Operations Research(8th Edition,1997) Sulltan Chand & Sons.

BOOKS FOR REFERENCE

1. V.Sundaresan, K.S.Subramanian, K.Ganesan," Operations Research",New Revised Edition,A.R.Publications,Sirkali.
2. Hamdy.A.Taha," Operations Research", 5th Edition,Prince Hall of India,New Delhi,1995.

Sem III Hours/Week: 7
10PMA3110 Credit: 5

TOPOLOGY

Objectives:

1. To generalize the concepts the students have learnt in Real Analysis
2. To train the students to develop analytical thinking

Unit I Topological spaces (15 Hrs)

Topological spaces-Basis for a topology-The order topology-The product topology on X x Y-The subspace topology-Closed sets and limit points-Continuous functions.
(Chapter II, Section 12 to 18)

Unit II Metric topology and connectedness (15 Hrs)

The product topology - The Metric Topology- The Quotient Topology - Connected Spaces- Connected Subspaces of the Real line-Components and local connectedness.
(Chapter II , Sections 19-22, Chapter III, Sections 23,24,25)

Unit III Compactness (15 Hrs)

Compact spaces-Compact subspaces of the real line-Limit point compactness. (Chapter III, Sections 26, 27, 28)

Unit IV Separation axioms (15 Hrs)

The Countability axioms - The Separation axioms-Normal spaces. (Chapter IV, Sections 30-32)

Unit V Complete Metric Spaces (15 Hrs)

The Urysohn lemma - The Urysohn Metrization Theorem-The Tietze extension Theorem. (Chapter IV, Sections 33-35)

BOOK FOR STUDY

James R. Munkres: Topology-Second Edition (Pearson Education INC) 2001 Reprint

BOOKS FOR REFERENCE

1 . James Dugunji: General Topology.

2. Hu, S.T: Elements of General Topology.

Sem III Hours/Week:7
10PMA3111 Credit: 5

MEASURE AND INTEGRATION

Objective:

1. To generalize the concept of integration using measures.
2. To develop the concept of analysis in abstract situations.

Unit 1 - Lebesgue Measure (15 Hrs)

Outer measure-Definition & properties-Lebesgue measure-measurable sets-properties-non-measurable set-measurable functions-Little wood's three principle.(Proofs of Egoroff's theorem and Lusin's theorem to be omitted) (Chapter 3 Sec. 1-6)

Unit 2 – Lebesgue Integral (15 Hrs)

Lebesgue Integral of simple function-bounded measurable function-of a nonnegative function-Fatou's lemma-monotone convergence theorem-General Lebesgue integral-Lebesgue convergence theorem-convergence in measure.
(Chapter 4 Sec.1-5)

Unit 3 –Differentiation and Integration (15 Hrs)

Differentiation of monotone functions-Vitali's lemma-Integral of derivative-Functions of bounded variation-Differentiation of an integral-absolute continuity-convex functions-Jensen's inequality.
(Chapter 5 Sec. 1-5)

Unit 4-General measure and Integration (15 Hrs)

Measure spaces-Measurable functions-Integration-Signed measure-Hahn decomposition theorem-Jordan decomposition theorem-Radon-Nikodym theorem-Lebsgue decomposition theorem.
(Chapter 11 Sec. 1-6)

Unit 5-Measure and outer measure (15 Hrs)

Outer measure and Measurability-extension theorem-Product measures-Fubini's theorem-Tonnelli's theorem.
(Chapter 12 Sec. 1, 2 and 4)

Note: Theorems, Propositions and results for which proofs are not given in the text are to be omitted.

BOOK FOR STUDY

Real Analysis –H.L.Royden - Prentice Hall of India 2001 edition

BOOKS FOR REFERENCE

1. De Barra.G. Measure and Integration-Wiley Eastern Limited 1991 edition
2. Walter Rudin-Real and Complex Analysis

Sem III Hours/Week: 7
10PMA3112 Credit : 5

STOCHASTIC PROCESSES

Objectives

1. To understand the stochastic models for many real life probabilistic situations.
2. To learn the well known models like Birth-death and queueing to reorient their knowledge of stochastic analysis.

UNIT-I : ELEMENTS OF STOCHASTIC PROCESSES AND MARKOV CHAINS (15 Hrs)

Classification of General stochastic Processes (definition of 'martingale' is omitted)– Transition probabilities – Examples of Markov chain(examples A, B, C and E only)-Transition probability matrices of a Markov chain – Classification of states of a Markov chain – Recurrence (Abel's lemma statement only)– Examples of recurrent Markov chains –More on recurrence. (Book 1 : Chapter 1 , section 3 and Chapter 2 , sections 1, 2, 3, 4, 5, 6, 7)

UNIT – II : BASIC LIMIT THEOREM OF MARKOV CHAINS AND APPLICATIONS (15 Hrs)

Discrete renewal equation – Absorption probabilities – Criteria for Recurrence – Random walk. (Book 1 : Chapter 3 , sections 1, 3, 4, 7)

UNIT – III : CLASSICAL EXAMPLES OF CONTINUOUS TIME MARKOV CHAINS (15 Hrs)

Two simple examples of stochastic processes – General pure birth processes and Poisson processes – More about Poisson processes – Birth and Death processes – Differential equations of Birth and Death processes – Examples of Birth and Death processes (examples 1 and 2 only) - Birth and Death processes with absorbing states. (Book 1 : Chapter 1 , section 2 and Chapter 4 , sections 1, 2, 4, 5, 6, 7)

UNIT – IV : RENEWAL PROCESSES (15 Hrs)

Definition of Renewal processes – Examples of Renewal processes– More on some special renewal processes (example A only) - Renewal equation and Elementary Renewal Theorem – The Renewal theorem – Applications of the Renewal theorem.
(Book 1 : Chapter 5 , sections 1, 2, 3, 4, 5, 6)

UNIT – V : QUEUEING PROCESSES (15 Hrs)

Queueing Processes – General description – Simple queueing processes (M/M/1) – Embedded Markov chain method applied to the queueing model(M/G/1) – Exponential series times(GI/M/1).
(Book 2 : Chapter 18 , sections 1, 2, 4, 5)

BOOKS FOR STUDY

1. Samuel Karlin and Howard M.Taylor , A First course in Stochastic Processes , second edition, Academic Press , 1975. (For Units I to IV)
2. Samuel Karlin and Howard M.Taylor , A Second course in Stochastic Processes, Academic Press , 1981. (For Unit V)

BOOKS FOR REFERENCES

1. Narayan Bhat, U, Elements of Applied Stochastic Processes, second edition John Wiley & Sons, New York
2. Prabhu, N.V, Stochastic Processes, MacMillon , New York
3. Medhi, J, Stochastic Processes, 2nd edition, New Age International Publishers,New Delhi.
4. Feller, An Introduction to Probability Theory and its Applications, Volume I, 3rd Edition, John Wiley & Sons, New York.

Sem III Hours/Week: 4
10PMA3201A Credit: 4

DIFFERENTIAL GEOMETRY

Objective:

1. To explain briefly the various intrinsic concepts and theories of Differential Geometry
2. To enlighten the students with many applications of this subject.

Unit - I (15 Hrs)

Analytical representation - Arc length, tangent - oscillating plane - torsion - formulae for Frenet contact.
(Chapter I, sections 1.1 - 1.7)

Unit-II (15 Hrs)

Natural equations - helices - general solution of natural equations - evolutes and involutes - imaginary curves - ovals
(Chapter I, sections 1.8-1.13)

Unit - III (15 Hrs)

Analytical representation - first fundamental theorem - normal, tangent plane - developalde surfaces- second fundamental form - Meusrier's theorem - Euler's theorem.
(Chapter 2, sections 2.1 to 2.6)

Unit-IV (15 Hrs)

Dupin's indicatrix - some surfaces - a geometrical interpretations of asymptotic and curvature lines conjugate directions - triply orthogonal system of surfaces.
(Chapter 2, sections 2.7-2.11)

Unit- V (15 Hrs)

Gauss - the equations of Gauss - Weingarten - the theorem of Gauss and the equations of Codazzi curvilinear coordinates in

space - some of applications of the Gauss and the Codazzi equations - the fundamental theorem of surface theory.
(Chapter 3. Sections 3.1-3.6)

BOOK FOR STUDY

Dirk J.Struik : Lectures on Classical Differential Geometry (Second edition), Addison Wesley Publishing Company.

BOOK FOR REFERENCE

Wilmore, TJ. : Differential Geometry.

Sem III Hours/Week: 4
10PMA3201B Credit: 4

DESIGN AND ANALYSIS OF ALGORITHMS

Objectives:

1. To impart the students the knowledge of design and analysis of algorithms which is the core of computer science.
2. To give importance to finding the complexity(order) of algorithms..

Unit I Introduction (15 Hrs)

What is an algorithm?—Algorithm specification-Performance analysis. (Sections 1.1, 1.2, 1.3.1 to 1.3.4.)

Unit II Elementary data structures (15 Hrs)

Stacks and Queues-Trees-Dictionaries-Priority Queues.

(Sections 2.1 to 2.4.)

Unit III Design of algorithm methods (15 Hrs)

Divide and conquer-General method-Binary search-finding the maximum and minimum in a set of items-Merge sort-Quick sort (Sections 3.1 to 3.5)

Unit VI Design of algorithm methods continuation (15 Hrs)

Tree traversal and search techniques-Techniques for Binary trees- Techniques for Graphs-Breadth first search and depth first search traversal-Connected components and spanning trees-Backtracking-General method-The 8-Queens Problem-Branch and Bound method-Traveling sales person algorithm (LCBB algorithm-problem only). (Sections 6.1 to 6.3, 7.1, 7.2, 8.1, 8.3)

Unit V Algebraic problems (15 Hrs)

Algebraic problems-The general method-Evaluation and Interpolation-The Fast Fourier transform(recursive algorithm only). (Sections 9.1 to 9.3)

BOOK FOR STUDY

Ellis Horowitz, Sartaj Sahni and Sanguthevar Rajasekaran-Fundamentals of Computer algorithms-Galgotia Publications Pvt Ltd 2000.

BOOK FOR REFERENCE

1. Aho A.V.,Hopcroft, J.E. and Ullman,J.D.: The Design and Analysis of Computer Algorithms.Additor Wesley Reading Mass(1974)
2. Goodman, S.E and Hedetniemi, S.T.: Introduction to the design and analysis of algorithms (McGraw Hill international Edition 1987).

Sem III Hours/Week:4
10PMA2401 Credit : 4

IDC-NUMERICAL METHODS

Objective

1. To introduce popular numerical methods to students from other departments.

Note: no derivations, problems only.

Unit I: Solution of Numerical Algebraic Equations & Curve fitting (15 Hrs)

Bisection method-Newton-Raphson method-Curve fitting straight line and parabola. (Sections 3.1, 3.4, 1.4, 1.5(Type I))

Unit II: Solution of Simultaneous Linear Equations (15 Hrs)

Gauss-Elimination method-Method of factorization-Gauss-Jacobi and Gauss-Seidel methods. (Sections 4.2, 4.4, 4.8, 4.9)

Unit III:Interpolation (15 Hrs)

Gregory-Newton forward and backward interpolation formulae-Sterling's formula-Lagrange's formula. (Sections 5.1, 6.1, 6.2, 6.3, 7.5, 8.7, 8.8)

Unit IV: Numerical Differentiation and Integration (15 Hrs)

Numerical differentiation-Trapezoidal rule-Simpson's one-third rule –Simpson's three-eighth rule. (Sections 9.2, 9.3, 9.9, 9.13, 9.14)

Unit V: Numerical Solution of Ordinary Differential Equations (15 Hrs)

Euler's method –fourth order Runge-Kutta method-Milne's predictor corrector method. (Sections 11.9, 11.12, 11.17)

BOOK FOR STUDY

Kandasamy.P, Thilakavathy.K, Gunavathy.K-Numerical Methods. Reprint 2001, S.Chand & Co.Ltd, New Delhi

BOOKS FOR REFERENCE

1. Gerald, Curtis and Wheatley, Patrick.O: Applied Numerical Analysis (FifthEdition)(Addison-Wesley).
2. Sastry.S.S.:Introductory Methods of Numerical Analysis (Prentice Hall of India, 2000).

Sem IV Hours/week: 7
10PMA4113 Credit : 5

FUNCTIONAL ANALYSIS

Objectives

1. To study the three structure theorems of Functional Analysis viz., Hahn- Banach theorem, open mapping theorem and uniform boundedness principle.
2. To introduce Hilbert spaces and operator theory leading to the spectral theory of operators on a Hilbert space.

UNIT I

Normed Linear Spaces (15 Hrs)

Normed linear spaces-Schauder Basis – Bounded Linear maps – equivalent norms – finite dimensional normed spaces – dual spaces (chapter 3)

UNIT II

Hahn Banach Theorem (15 Hrs)

General form – continuous extension form- second dual – reflexive spaces – dual of C[0,1] Separation form of Hahn-Banach theorem(chapter 4,sections1-7)

UNIT III

Uniform Boundedness Principle and Open Mapping Theorem (15 Hrs)

Uniform boundedness principle – Weak Convergence – The Open Mapping Theorem and Applications –The Closed Graph Theorem (Chapter 5, Sections 1, 3 and Chapter 6, Sections 1, 3)

UNIT IV (15 Hrs)

Inner Product Spaces

Parallelogram law – Orothogonality –Orthonormal sets – Complete Orthonormal sets- Riesz Representation Theorem (chapter 7)

UNIT V (15 Hrs)

Hilbert Space Operators

Adjoint of an operator – Isometric operator – Unitary Operator –Self – Adjoint operator- Normal operator- Projection operator and its properties – Preliminaries, Basic Results and examples only in Chapter 9. (Chapter 8, Chapter 9 - Sec 9.0, 9.1, 9.2 only)

BOOK FOR STUDY

Bose, S.C: Introduction to Functional Analysis, MacMillan India limited, Delhi, 1997

BOOKS FOR REFERENCE

1. Somasundaram.D : Functional Analysis, Viswanathan,S. &Co., Chennai.
2. Sinmons, G.F.: Introduction to Topology & Modern Analysis, International student Edition McGraw Hill Kogakusha Ltd., 1963.
3. Walter Rudin: Functional Analysis, Tata McGraw Hill publishing Co., New Delhi 1977.

Sem IV Hours/Week: 7
10PMA4114 Credit : 5

FLUID DYNAMICS

Objectives

1. To give the students an introduction to the behaviour of fluids in motion.
2. To give the students a feel of the applications of Complex Analysis in the analysis of the flow of fluids.

Unit I: Kinematics of fluids in motion (15 Hrs)

Real fluids and Ideal fluids – Velocity of a fluid at a point-Stream lines and path lines-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 (Chapter 2–Sections 2.1 to 2.9)

Unit II: Equations of Motion of a Fluid (15 Hrs)

Pressure at a point in a fluid at rest-Pressure at a point in a moving fluid-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. (Chapters 3-Sections 3.1, 3.2, 3.4-3.7 and 3.9)

Unit III: Some Three- Dimensional Flows (15 Hrs)

Introduction-Sources, Sinks and Doublets Images in rigid infinite plane-Images in solid spheres-Axi-Symmetric flows; Stoke's Stream Function. (Chapter 4-Sections 4.1 to 4.5)

Unit IV: Some Two- Dimensional Flows (15 Hrs)

The Stream Function-The Complex Velocity 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. (Chapter 5-Sections 5.3 to 5.8)

Unit V: Viscous Fluid (15 Hrs)

Stress components in a real fluid-Relation between Cartesian Components of Stree-Translational motion of fluid element-The Co-efficient of Viscosity and Laminar flow-The Navier-Stokes equation of a viscous fluid-Some solvable problems in viscous flow-Steady motion between parallel planes only. (Chapter 8-Sections 8.1 to 8.3, 8.8, 8.9, 8.10.1).

BOOK FOR STUDY

Frank Chorlton: Textbook of Fluid Dynamics, CBS Publishers & Distributors, Edition of Year 2000.

BOOKS FOR REFERENCE

1. Milne and Thomson.L.M. Theoretical Hydrodynamics.

2. Rathy.R.K.: An Introduction to Fluid Dynamics.

Sem IV Hours/Week: 4
10PMA4202A Credit : 4

AUTOMATA THEORY

Objective:

1. To make the students understand the nuances of Automata and Grammar.
2. To make them understand the applications of these techniques in computer.

Unit I Finite Automata and Regular expressions (15 Hrs)

Definitions and examples-Deterministic and Nondeterministic finite Automata-Finite Automata with e-moves-.
(Book 1-Chapter 2, Section 2.1 to 2.5)

Unit II Contex free grammars (15 Hrs)

Regular expressions and their relationship with automation. Grammar-ambiguous and unambiguous grammars-derivation trees-Chomsky Normal form. (Book 1-Chapter 2, Section 2.5 . Chapter 4, Sections 4.1 to 4.3, 4.5 to 4.6)

Unit III Push down Automata (15 Hrs)

Pushdown Automaton –definition and examples-Relation with Contex free languages. (Book 1 Chapter 5 Section 5.2, 5.3 Chapter 6 Section 6.1)

Unit IV Finite Automata and lexical analysis (15 Hrs)

Role of a lexical analyzer-Minimizing the number of states of a DFA-Implementation of a lexical analyzer. (Book 2-Chapter 3, Section 3.1 to 3.8)

Unit V Basic parsing techniques (15 Hrs)

Parsers-Topdown-Bottomup-Shiftreduce-operatorpredence-Recursive descent-Predivine parsing
(Book 2-Chapter 5, Section 5.1 to 5.5)

BOOKS FOR STUDY

John E. Hopcroft and J.D.Ullman, Introduction to Automata theory, languages and combinatorics by Narosa Publishing House-Chennai

A.V.Aho and J.D.Ullman Principles of compiler design by, Narosa Publishing House-Chennai.

Sem IV Hours/Week: 4
10PM 4202B Credits: 4

JAVA PROGRAMMING

Objectives

1.To develop programming skills in Java.

2.To learn the applications of Java.

Unit I (15 Hrs)

Variables-Objects-Operators-String Class-Concatenation-The String Buffer Class. (Chapter 1,Sections 6-11,Chapter 2, Sections 1-7,9)

Unit II (15 Hrs)

The IF statement-Nested Conditionals-Operators-Boolean Variables-The Switch statement-FOR, WHILE, DO...WHILE-Nested Loops. (Chapter 3,Sections 1-11,Chapter 4,Sections 1-6)

Unit III (15 Hrs)

Methods-Localvariables-Overloading-Classes-Constructors-Copy Constructors-Wrapper Classes. (Chapter 5,Sections 1-7,Chapter 6,Sections 1-6,10)

Unit IV (15 Hrs)

Composition-Recursive Classes-Inheritance-The Super Keyword-The Object Class- The Close () and Equals () methods. (Chapter 7,Sections 1-10)

Unit V (15 Hrs)

Arrays-The Vector Class-Two Dimensional Arrays-Applets-The Applet Class-The Thread Class-Exceptions. (Chapter 8,Sections 1-5.7,Chapter 9,Sections 1-4)

BOOK FOR STUDY

John Hubbard: Programming with JAVA Schaum's Outline Series, McGraw Hill.

BOOKS FOR REFERENCE

Patrick Norton: Complete reference in JAVA.

Sem : IV Hours/Week: 4
10PMA4203A Credit : 4

ALGEBRAIC NUMBER THEORY

Objectives:

1. To expose the students to the charm,niceties and nuances in the world of numbers.
2. To highlight some of the Applications of the Theory of Numbers.

Unit-I (15 Hrs)

Elementary Properties of Congruences-Complete Residue System-Reduce Residue System-Some Applications of Congruences. (Sec 2.1-2.3 Pages 49-70)

Unit-II (15 Hrs)

Solutions of Congruences-Algebraic Congruences-Solutions of the Problems of the Type ax+by+c=0-Simultaneous Congruences. (Sec 2.4-2.7 Pages 71-97)

Unit-III (15 Hrs)

Algebraic Congruence-Reduction of f(x)=0(mod m)-Primitive Roots-Theory of Indices. (Sec 3.1-3.4 Pages 98-128)

Unit-IV (15 Hrs)

Quadratic Residues-Legendre's Symbol.
(Sec 6.1-6.2 Pages 218-232)

Unit-V (15 Hrs)

Quadratic Reciprocity Law-Quadratic Residue for Composite Modules-Jacobi's Symbol.
(Sec 6.3-6.4 Pages 233-246)

Text Book:

K.C.Chowdhury A First Course in Theory of Numbers Asian Books Private Limited-I Edition(2004).

Reference Books:

1. Basic Number Theory by S.B.Malik. Vikas Publishing House Private Limited.
2. Number Theory by George E.Andrews. Hindustan Publishing Corporation-1984 Edition.

Sem IV Hours/Week: 4
10PMA4203B Credit : 4

OPTIMIZATION TECHNIQUES

Unit 1: (15 Hrs)

Optimisation of functional – Gateaux and Frechet Differentials Frechet derivatives – Extreme – Euler – Lagrange Equations – Problems with variable end points – Problems.

Unit 2: (15 Hrs)

Birth constraints – Global theory convex and concave functionals– conjugate convex, concave functionals – Dual optimisation problems – Min – Max theorem of game theory.

Unit 3: (15 Hrs)

Global theory of constrained optimisation. Lagrange multiplier theorem – Inverse function theorem – Equality and Inequality constraints – Kuhn – Tucker theorem – Optimal control theory – Pointry agin Maximum principle.

Unit 4: (15 Hrs)

Iterative methods of optimization – Methods of solving equations – Successive approximation – Newton's method – Desceuh methods – Steepest descent .

Unit 5: (15 Hrs)

Conjugate direction methods – conjugate gradient method – methods for solving constrained problems.

Text Book:

D. G. Leremberji's "Optimization By Vector Space Methods". (Chapter: 7, 8, 9 and 10)

INTER DEPARTMENTAL COURSE - IDC

BIOCHEMISTRY

10PBC2401 APPLIED NUTRITION

10PBC3402 FIRST AID MANAGEMENT

BIOTECHNOLOGY

10PBT2401 BASIC BIOINFORMATICS

10PBT3402 BASIC GENOMICS & PROTEOMICS

CHEMISTRY

10PCH2401 HEALTH CHEMISTRY

10PCH3402 INDUSTRIAL CHEMISTRY

COMMERCE

10PCO2401 FINANCIAL ACCOUNTING FOR MANAGERS

10PCO3402 MANAGEMENT CONCEPTS & ORGANIZATIONAL BEHAVIOR

COMPUTER APPLICATIONS

10PCA2401 INTERNET CONCEPTS

10PCA2402 FOUNDATION OF COMPUTER SCIENCE

10PCA3403 COMPUTER APPLICATIONS FOR SOCIAL SCIENCES

10PCA3404 FUNDAMENTALS OF PROGRAMMING

COMPUTER SCIENCE

10PCS2401A FUNDAMENTALS OF IT

10PCS2401B WEB DESIGN

10PCS3402A FLASH

10PCS3402B DREAM WEAVER

ECONOMICS

10PEC2401 ECONOMICS FOR MANAGERS

10PEC3402 INDIAN ECONOMY

ELECTRONICS

10PEL2401 ELECTRONICS IN COMMUNICATION

10PEL3402 COMPUTER HARDWARE

ENGLISH

10PEN2401 BUSINESS ENGLISH

10PEN3402 INTERVEIW SKILLS AND GROUP DYNAMICS

HISTORY

10PHS2401 PUBLIC ADMINISTRATION

10PHS3402 APPLIED TOURISM

HUMAN RESOURCE MANAGEMENT

10PHR2401 FUNDAMENTALS OF HRM

10PHR3402 PERSONALITY AND SOFT SKILLS DEVELOPMENT

INFORMATION TECHNOLOGY

10PIT2401A FUNDAMENTALS OF IT

10PIT2401B WEB DESIGN

10PIT3402A FLASH

10PIT3402B DREAM WEAVER

MATHEMATICS

10PMA2401 OPERATIONS RESEARCH

10PMA3402 NUMERICAL METHODS

PHYSICS

10PPH2401 MODERN PHOTOGRAPHY

10PPH3402 MEDICAL PHYSICS

PLANT BIOLOGY & PLANT BIOTECHNOLOGY

10PPB2401 NANOBIOTECHNOLOGY

10PPB3402 REMOTE SENSIND AND GIS

TAMIL

10PTA2401 muRg gzpj NjuTj jkpo - 1

10PTA3402 muRg gzpj NjuTj jkpo - 2