

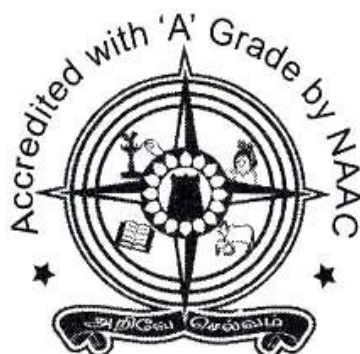
YADAVA COLLEGE

(Autonomous)

Govindarajan Campus, Thiruppalai

Madurai - 625 014

DEPARTMENT OF MATHEMATICS



B.Sc(Reg & S/F)., Degree course in Mathematics

CBCS (2015 – 2016)

Course Profile

Final Copy of syllabus incorporating all suggestions made in the meeting of Board of studies held on 06.04.2015

DEPARTMENT OF MATHEMATICS
UNDERGRADUATE PROGRAMME
COURSE CONTENT
Choice Based Credit System(w.e.f. 2015 – 2016)

Sem	Part		Title of the Subject	Teaching Hour/ Week	Credits	Evaluation		Exam hours
						Internal	External	
I	Part I		Tamil	5	3	25	75	3
	Part II		English	5	3	25	75	3
	Part III	Core	Analytical Geometry 3D & Vector Calculus	6	3	25	75	3
			Calculus & Trigonometry	5	3	25	75	3
		Allied	Physics I	5	5	25	75	3
	Part IV	ENS	Environmental Science	2	2	25	75	3
		SBE	Communicative English I	2	2	25	75	3
	Part V	NSS/NCC /PE	-	-	-	-	-	-
II	Part I		Tamil	5	3	25	75	3
	Part II		English	5	3	25	75	3
	Part III	Core	Classical Algebra	6	3	25	75	3
			Differential Equations	5	3	25	75	3
		Allied	Physics II	5	5	25	75	3
	Part IV	VAE	Value Education	2	2	25	75	3
		SBE	Communicative English II	2	2	25	75	3
	Part V	NSS/NCC /PE	-	-	-	-	-	-

Sem	Part		Title of the Subject	Teach. Hour/ Week	Credits	Evaluation		Exam hours
						Internal	External	
III	Part I		Tamil	5	3	25	75	3
	Part II		English	5	3	25	75	3
	Part III	Core	Modern Algebra	6	4	25	75	3
		Elective I	Programming in C (or) M.S.Office	3	3	25	75	3
			Practical I- Programming in C	2	2	40	60	3
		Allied	Physics III	5	5	25	75	3
	Part IV	NME	Mathematics for Competitive Exam I	2	2	25	75	3
		SBE	Communicative English I	2	2	25	75	3
	Part V	NSS/NCC /PE	-	-	-	-	-	-
IV	Part I		Tamil	5	3	25	75	3
	Part II		English	5	3	25	75	3
	Part III	Core	Real Analysis	6	4	25	75	3
		Elective II	Programming in C++ (or) RDBMS	3	3	25	75	3
			Practical II- Programming in C++	2	2	40	60	3
		Allied	Physics IV	5	5	25	75	3
	Part IV	NME	Mathematics for Competitive Exam II	2	2	25	75	3
		SBE	Communicative English II	2	2	25	75	3
	Part V	NSS/NCC /PE	-	-	-	-	-	-

Sem	Part		Title of the Subject	Teach. Hour/ Week	Credits	Evaluation		Exam hours
						Internal	External	
V	Part I		Nil	-	-	-	-	-
	Part II		Nil	-	-	-	-	-
	Part III	Core	Operation Research	6	5	25	75	3
			Complex Analysis	6	5	25	75	3
			Statistics I	5	3	25	75	3
			Mechanics	6	5	25	75	3
		Elective III	Java (or) Oracle	3	3	25	75	3
			Practical III - Oracle	2	2	40	60	3
	Part IV	SBE	Soft Skills I	2	2	25	75	3
	Part V	NSS/NC C/PE	-	-	-	-	-	-
VI	Part I		Nil	-	-	-	-	-
	Part II		Nil	-	-	-	-	-
	Part III	Core	Linear Algebra	6	5	25	75	3
			Automata Theory	6	5	25	75	3
			Graph Theory	6	5	25	75	3
			Statistics II	5	4	25	75	3
			Numerical Analysis	5	3	25	75	3
	Part IV	SBE	Soft Skills II	2	2	25	75	3
	Part V	NSS/NC C/PE	-	-	-	-	-	-

DEPARTMENT MATHEMATICS
UNDERGRADUATE PROGRAMME

(w.e.f. 2015 – 2016)

Teaching hours and Credit

Subject			Semester								
			I	II	III	IV	V	VI	Total papers	Total	
										Hr	Cr
Part I		Hr	5	5	5	5	-	-	4	20	-
		Cr	3	3	3	3	-	-		-	12
Part II		Hr	5	5	5	5	-	-	4	20	-
		Cr	3	3	3	3	-	-		-	12
Part III	Core	Hr	11	11	6	6	23	28	15	85	-
		Cr	6	6	4	4	18	22		-	60
	Allied	Hr	5	5	5	5	-	-	4	20	-
		Cr	5	5	5	5	-	-		-	20
	Elective	Hr	-	-	5	5	5	-	3	15	-
		Cr	-	-	5	5	5	-		-	15
Part IV	ENS	Hr	2	-	-	-	-	-	1	2	-
		Cr	2	-	-	-	-	-		-	2
	VAE	Hr	-	2	-	-	-	-	1	2	-
		Cr	-	2	-	-	-	-		-	2
	SBE	Hr	2	2	2	2	2	2	6	12	-
		Cr	2	2	2	2	2	2		-	12
	NME	Hr	-	-	2	2	-	-	4	4	-
		Cr	-	-	2	2	-	-		-	4
Part V	NSS/ NCC/PE	Hr	-	-	-	-	-	-	-	-	-
		Cr	-	-	-	-	-	1	-	-	1
Total		Hr	30	30	30	30	30	30	-	180	-
		Cr	21	21	24	24	25	25	-	-	140

CLASSICAL ALGEBRA

Semester : II

Subject Code:

Contact hours per Week : 6

Credit : 3

Objective :

- ◆ To make the students familiar with the importance of Classical Algebra such as Sequence & Series and Theory of Equations
- ◆ To enable the students to attain skills to participate in mathematical competitions and competitive examinations

Unit I

Sequence – Bounded – Monotonic – Convergent – Divergent and Oscillating – The algebra of limits – Behaviour of Monotonic Sequence – Some theorems on limits – Subsequence – Limit points – Cauchy Sequence (Chapter 3- page no. 39 to 103)

Unit II

Series for positive terms – Infinite series - Comparison test – Kummer's test - D'Alemberts test – Raabe's test – De Morgan test - Gauss's test
(Chapter 4 – page no. 112 to 144)

Unit III

Infinite series - Cauchy's root test - Cauchy's Condensation test -Cauchy's integral test – Series of arbitrary terms - Alternating series - Leibnitz's test
(Chapter 4 – page no. 145 to 156)

Unit IV

Relation between roots and Coefficient - Reciprocal equations (Only simple problem) (Chapter 2 – Section 2.2 , 2.3 in S.Arumugam and Isaac page no. 63 to 91)

Unit V

Diminishing and increasing the roots – Newton's and Horner's method of finding decimal roots. (Chapter 2 – Section 2.4 , 2.5 – 1 , 2 in S.Arumugam and Isaac page no. 92 to 103)

TEXT BOOKS:

- 1.Algebra – Vol-I: T.K.Manickavasagam Pillai, T.Natarajan, K.S.Ganapathy
– S.Viswanathan, Pub.
- 2.Sequence and Series : Arumugam and Isaac : Scitech Publication

REFERENCE BOOK :

Real Analysis: Vasista - Krishna Prakasan Media (Pvt) Ltd-Meerut

CALCULUS AND TRIGONOMETRY

Semester : I

Subject Code:

Contact hours per Week : 5

Credit : 3

Objective :

To enable the students

- ◆ to acquire knowledge on evaluation techniques of definite & indefinite integrals and to know the knowledge of trigonometry.
- ◆ to attain skills to participate in mathematical competitions and competitive examinations

Unit I

Envelops – Curvature - Circle, Radius and Center of curvature – Evolutes - Radius of curvature in polar co-ordinates – Polar equations.
(chapter 10-section 10.1.0 to 10.2.8)

Unit II

Jacobian - Multiple integrals – double, triple integrals – Beta, gamma functions.
(chapter 6-section 6.1.1 ,6.1.2, chapter 7-section 7.2.1 to 7.5 , chapter 5- 5.1 to 5.4 in calculus II)

Unit III

Expansion of $\sin nx$, $\cos nx$, $\tan nx$, $\sin^n x$, $\cos^n x$.
(chapter 3- section-3.1 to 3.5 in trigonometry)

Unit IV

Hyperbolic functions – Inverse hyperbolic functions – Logarithm of a complex number(chapter 4-4.1,4.2,4.2.2,4.2.3 , chapter 5- 5.5,5.5.1,5.5.2 in trigonometry)

Unit V

Fourier series - Trigonometric series-Even and odd functions - half range Fourier series. (chapter 6 in sequence and series & Fourier series)

TEXT BOOKS :

Calculus –Volume I & II : Narayanan And T.K..Manickavasagam Pillai –
S.Viswanathan publication – Chennai

Trigonometry: Narayanan & T.K.Manickavasagam pillai, S.Viswanathan Publication

Sequence Series & Fourier Series – Arumugam & Isaac , New gamma publishing

REFERENCE BOOKS :

- 1.Differential Calculus : Shanthi Narayanan – S.Chand Company – New Delhi
- 2.Integral Calculus : Shanthi Narayanan – S.Chand Company – New Delhi
- 3.Engineering Mathematics : A.Singara Velu – S.Chand Company – New Delhi

ANALYTICAL GEOMETRY OF 3D & VECTOR CALCULUS

Semester : I

Subject Code:

Contact hours per week : 6

Credit : 3

Objective :

To enable the students

- ♦ to provide the students with basic knowledge of Geometry
- ♦ to improve their analytical ability in solving Geometric problems
- ♦ to attain skills to participate in mathematical competitions and competitive examinations

Unit I

Plane equation - Angle between two planes - Length of the perpendicular - Bisecting plane - Distance between two planes.

(Chapter 2- Sections 2.1 ,2.2)

Unit II

The straight-line – Symmetrical form - Image of a point – Image of a line about a plane – The plane and the straight line – Angle between two straight line – Coplanar lines - Shortest distance between two lines.

(Chapter 3- Sections 3.1 ,3.2)

Unit III

The sphere – Equation of the sphere - Length of the tangent plane- Section of a sphere - Equation of a circle on a sphere.

(Chapter 4- Sections 4.1 to 4.3)

Unit IV

Vector differentiation – Gradient, divergence ,curl - Connected theorems – Problems.

(Chapter 5- Sections 5.1 to 5.4)

Unit V

Vector integration - Line integral - Surface integral – Volume integral
Green's theorem – Stoke's theorem (only statement without proof) - Simple problems
(Chapter 7- Sections 7.1 to 7.3)

TEXT BOOKS :

1. Analytical Geometry of Three Dimensions and Vector Calculus: Arumugam & Issac - New Gamma Publishing House, Edition 2011.
2. Analytical Geometry of Three Dimensions and Vector Calculus:
Manickavasagam Pillai & Narayanan – Viswanathan Publishing Company,
First edition 1955. ISBN – 81-87156-03-1.

REFERENCE BOOK :

Analytical Geometry – 3D & Vector calculus: Dr.M.K.Venkataraman
& Mrs.Manoramasridar - The national publishing company - Chennai

DIFFERENTIAL EQUATIONS & ITS APPLICATIONS

Semester : II

Subject Code:

Contact hours per Week : 5

Credit : 3

Objective :

- ◆ This course aims at acquiring skills in solving differential equations
- ◆ The students apply their knowledge on differential equations to solve problems related to thermodynamics
- ◆ To enable the students to attain skills to participate in mathematical competitions and competitive examinations

Unit I

Linear Equation with constant coefficient – Particular integral X is of the form $e^{\alpha x}$, $\cos \alpha x$ (or) $\sin \alpha x$, x^m , $e^{\alpha x} X$, $e^{\alpha x} \sin \beta x$, $e^{\alpha x} \cos \beta x$.

(Chapter 5 - Sections 5.0)

Unit II

Linear equation with variable coefficients – Equations reducible to the linear homogeneous equations - Variation of parameters

(Chapter 5 - Sections 5.1 to 5.5 ,5.6 & Chapter 8 – Section 4 only)

Unit III

Simultaneous linear differential equations-Total differential equation – Rules for integrating $Pdx+Qdy+Rdz = 0$.

(Chapter 6- Sections 6.1 to 6.6 & chapter 11 – section 11.1.1 to 11.1.4)

Unit IV

Partial differential equations of first order – Classification of integrals – Derivations of partial differential equations – Lagrange's method of solving – The linear equations.

(Chapter 12- Sections 12.1 ,12.4)

Unit V

Laplace transform – Theorems – problems – Evaluation of integrals -
Inverse Laplace transforms – Results – Problems – Solving ordinary differential
equations with constant coefficients and variable coefficients and simultaneous linear
differential equations using Laplace transforms. (Chapter 9- Sections 9.1 ,9.9)

TEXT BOOK :

Differential Equations & its applications: Narayanan and T.K. Manickavasagam pillai –
S.Viswanathan Publishing Company – Chennai

REFERENCE BOOK :

Differential Equations : Arumugam & Issac – Scitech Publication – Chennai

MODERN ALGEBRA

Subject Code :

Semester : III

Hours per Week : 6

credits : 4

Objective :

To enable Students

- ♦ to understand the Mathematical principles in abstract algebra
- ♦ to make the students familiar with discrete structure
- ♦ to attain skills to participate in Mathematical competitions and competitive examinations

Unit I

Groups : Introduction – Definition and examples – Elementary properties of a group - Equivalent definition of a group – Permutation groups – Subgroups – Cyclic Groups.

(section 3.0 to 3.6 of chapter 3)

Unit II

Order of an element - Cosets and Lagrange's theorem – Euler's theorem – Fermat's theorem - Quotient groups – Normal subgroups – Quotient groups.

(section 3.7 to 3.9 of chapter 3)

Unit III

Isomorphism – Isomorphism is an equivalence relation among groups – Any infinite cyclic group is isomorphic to the group of integers – Any finite cyclic group of order n is isomorphic to Z_n . Cayley's theorem - Homomorphism – Types of homomorphism – Kernel of homomorphism – The fundamental theorem of homomorphism.

(section 3.10, 3.11 of chapter 3)

Unit IV

Rings: Definition and examples – Elementary properties of rings – Isomorphism – Types of rings – Division ring and Fields – Zero divisor of the ring – Integral domain Characteristic of a ring – Subrings.

(section 4.1 to 4.6 of chapter 4)

Unit V

Ideals – Quotient rings – Maximal and Prime ideals - Homomorphism of rings –
Field of quotients of an integral domain – Every integral domain can be embedded into a
field.

(section 4.7 to 4.11 of chapter 4).

TEXT BOOK :

Modern Algebra : S. ARUMUGAM & ISAAC - SCITECH publication Ltd, Chennai-17
, ISBN – 81-88429-18-X.

REFERENCE BOOK :

Modern Algebra : Manickavasagam Pillai - Viswanathan Publishing
Company –Chennai

PROGRAMMING IN C

Subject Code :

Semester : III

Hours per Week : 3

Credits : 3

Objective :

To enable the students

- ◆ to acquire Knowledge on C - Language
- ◆ to train them to write C - Programs

Unit I

Character set – C token – Identifiers – Constants – Data types – Variables
operators – Assignment, increment, decrement, ternary – logical, arithmetic, bitwise, shift
and special operators – Expression – Type conversion – Input / Output operations – Scan
Function, format specifier – Scan features – Output operations – Printf function

Unit II

Control statement: If statements (different forms), for loop, while loop, do – while
loop - Break statement – Continue statement – exit () function – switch statement - go to
statement – Programs – Arrays – One dimensional and two dimensional – Initialization -
Two dimensional sorting – Multidimensional arrays

Unit III

User defined functions: C function – Return statement – Calling a function by
value, by reference - Category of functions, function with no arguments and no return
values – functions with arguments and return values – Nesting of functions – Recursion –
Functions with arrays – Storage class modifiers – Library functions

Unit IV

Character handling in C: Declaration of string variables – Reading and writing
strings – String handling functions - String handling using library functions – Array of
strings – pointers – Pointer operators – Accessing through pointers – Pointer expressions
– assignments – Pointers in arithmetic operations – Pointers and arrays – Pointers and
character strings.

Unit V

Structures and unions: Structure – Giving values –Initialization – Arrays of structures – Arrays within structures – Nested structures – Structures and functions – Structures and pointers - Comparison of structure variables – Unions – Bit field – Type definition – enumerated data type – Data files – Organization of files – File operations and file functions

TEXT BOOK :

C and Data Structures (Second Edition) : E. Balagurusamy - Tata Mcgraw Hill,(1998)

REFERENCE BOOK :

ANSI C : P.Radha Ganesan.- Scitech Publications (INDIA) Pvt Ltd.

PROGRAMMING IN C PRACTICALS

Subject Code :

Semester : III

Hours per Week : 2

Credits : 2

1. Write a program to calculate the simple interest.
2. Write a program to calculate the salesman commission.

<i>Amount</i>	<i>Commission</i>
10,000	5%
15,000	8%
More than 15,000	10%

3. Write a program to find the sum of digits.
4. Check whether the given number is prime or not.
5. Write a program to find the roots of the quadratic equation
6. Write a program to reverse the given string and checking palindrome.
7. Write a program to evaluate the sine function
8. Write a program to find the nc_r using function
9. Write a program to sort the numbers (ascending and descending)
10. Write a program to multiply the given two matrices.
11. Write a program to find the determinant of the given matrix.
12. Write a program to maintain the employee details using structures.
13. Write a program to arrange names alphabetically using pointers.
14. Write a program to count number of words and characters in the given text.
15. Write a program to write the students information's using `fwrites()`.
16. Write a program to count the occurrence of the character in a string

MS OFFICE

Subject Code :

Semester : III

Hours per Week : 3

Credits : 3

Objective :

- ◆ This course aims to provide the students with basic knowledge on MS-Word, excel, power point and Access
- ◆ It also provides them hands on training

Unit I

MS Word introduction – Features of word processor – Menus in Ms Word -
Creating a document - Changing the format text – cut, copy, paste - Define documents -
Saving a document - Page setup – Print a document.- Moving and coping the text -
Table Creation -

Unit II

Working with template - Find and Replace - Toolbar – Change case -
Superscript & subscript - Header & Footer – Spelling check - Bullets & Numbering –
Mail Merge

Unit III

Introduction to spread sheet and Excel - Features - Parts of spread sheet -
Working with work sheet - Entering formulae in cells – Formatting work sheet – Using
Chart Wizard (Area,Bar,Coloumn, Doushnut,Line ,pie,Radar and 3D Charts)

Unit IV

Data manipulation – Printing a work sheet – Various types of functions
(Statistical, Mathematical, String, Logical, Date and Time) What is Power point? – parts
of a power point Screen – Slide show

Unit V

Working with wizard presentation - What is Access – What is Database – What
are Tables, Queries, Forms – Creating a Table using wizard – Creating a form-using
wizard

TEXT BOOK :

Complete Reference –Ms-Office 2000 - publish Tata Mcgraw Hill – New Delhi

REFERENCE BOOK:

Computer practice – I : V.Ramesh Babhu and R.Samyuktha - VRB publishers - Chennai

MS OFFICE PRACTICALS

Subject Code :

Semester : III

Hours per Week : 2

Credits : 2

Design a document using MS-WORD with the following options:

1. Bold, Underline, Italics, Different styles
2. Tables
3. Header and footer
4. Mail merge

MS-EXCEL

5. To perform mathematical function
6. To perform string function
7. To perform logical function
8. To perform Date and time function
9. To Create different types of chart for some data

MS-POWERPOINT

10. Create a slide – show

MS-ACCESS

11. Create a database in access
12. Executing simple Queries

Mathematics for Competitive Examinations – I

Subject Code :

Semester : III

Hours per Week : 2

Credits : 2

Objective :

To enable the students to

- ◆ Attain numerical aptitude skills
- ◆ Attain reasoning aptitude skills
- ◆ Appear in any competitive examinations skills as civil service , TNPSC exams and entrance examinations such as MAT , CAT , SAT , XLRI exams.

Unit I

Numbers – H.C.F, L.C.M, decimal fractions Simplification, Square roots and Cube Roots – Average – Problems on numbers.

Unit II

Problems on ages - Percentage – Profit and Loss – ratio and proportion – partnership

Unit III

Chain rule – Time and Work – Pipes and cisterns – simple and Compound interest.

Unit IV

Series Completion – Coding – Decoding – Blood Relations

Unit V

Puzzle Test – Direction Sense Test – Logical Venn diagrams

Text Book :

1. Quantitative Aptitude for competitive Examinations , R.S Aggarwal – S.Chand & Co , ltd , ISBN : 81-219-0623-6
2. Test of Reasoning , R.S Aggarwal – S.Chand & Co , ltd , ISBN : 81-219-0623-6

Reference Books :

1. Quantitative Aptitude – Tata McGraw Hill
2. Test of Reasoning – Tata McGraw Hill

REAL ANALYSIS

Semester : IV

Subject Code :

Hours per Week : 6

Credits : 4

Objective :

To enable the students

- ♦ to understand the concept in metric space and continuity
- ♦ to provide them the knowledge about convergence of functions
- ♦ to attain skills to participate in mathematical competitions and competitive examinations

Unit I

Countable sets – Uncountable sets – Inequalities of Holders and Minkowski–
Metric space – Open sets – Interior of a set – Closed sets – Limit points – Dense sets.
(chapter 1 – 1.2, 1.3 , 1.4 & chapter 2- 2.1 to 2.10)

Unit II

Complete metric space – Introduction –completeness - Cantor's intersection
theorem – Baire's category theorem.
(chapter 3 – 3.0 to 3.2)

Unit III

Continuity – Homeomorphism – Uniform continuity -Discontinuous
functions on \mathbb{R} .
(chapter 4 – 4.0 to 4.4)

Unit IV

Connectedness – Definition and examples – Connected subsets of \mathbb{R} –
Connectedness and continuity.
(chapter 5 – 5.0 to 5.3)

Unit V

Compactness – Introduction – Compact space – Compact subsets of \mathbb{R} –
Equivalent characteristics for compactness – Compactness and Continuity
(chapter 6 – 6.0 to 6.4)

TEXT BOOK :

Modern Analysis: Dr.Arumugam & Isaac – New Gamma publishing house

REFERENCE BOOK :

Methods of Real analysis: Ritchard R.Goldberg – Oxford & IBH publishing company
(pvt) Ltd – New Delhi. Chapter 4,5,6,9,10

OBJECT ORIENTED PROGRAMMING IN C++

Semester : IV

Subject Code :

Hours per Week: 3

Credits : 3

Objective :

- ◆ This course aims at understanding the C++ compiler
- ◆ Trains the students for writing C++ programs

Unit I

Introduction – Basic concept of OOP – Benefits of OOP - Object oriented languages – applications of OOP – more C++ statements - Structure C++ program – Control statements: looping, break, continue, exit(), switch – Arrays – Array initialization - two dimensional arrays - one dimensional arrays – Initialization of two dimension arrays – two dimensional sorting – multi dimensional arrays.

Unit II

Functions – main functions – function prototyping –Inline functions - private member function arrays within a class – Nesting of member functions – static member functions arrays of objects – default parameters static data member functions arrays of objects –Declaration of string variables – reading strings – string handling functions – array of function.

Unit III

Classes and objects – public, private, protected– Inline member function-array of object – construction parameterized constructors– explicit constructor – destructor – friend function – friend classes–object assignments – Nested class – copy constructor classes and structures – inheritance – single inheritance – defining derived classes – constructors and destructors of inheritance – Virtual base class.

Unit IV

Pointer to objects – This pointer – Pointers to Derive Classes – Virtual functions – pure virtual functions – C++ streams – C++ stream classes Unformatted I/O Operations Managing Output with manipulators.

Unit V

Classes of file stream operations – opening and closing a file – detecting end of file
– more about open () – files modes – file pointers and the manipulator sequential input
and output operations – updating a file random access– command line arguments.

TEXT BOOK :

Object Oriented Programming with C++ by E.BALAGURUSAMY,
Tata McGraw – Hill Publishing Company Ltd 1998.

REFERENCE BOOK :

Object Oriented Programming with C++ by P.Radhaganesan.

OBJECT ORIENTED PROGRAMMING IN C++ PRACTICALS

Semester : IV

Subject Code :

Hours per Week: 2

Credits : 2

1. Write a program to maintain the stock details using class.
2. Write a program to maintain the library details using constructor and destructor.
3. Write a program to add complex numbers using operator overloading
4. Write a program to multiply complex numbers using operator overloading
5. Write a program to maintain the employees information using inheritance.
6. Write a program to create a student file.
7. Write a program to create a quiz program using files.
8. Write a program to convert temperature Fahrenheit into Celsius
9. Write a program to print the following output using for loops.

1
22
333
4444 and so on
10. Write a program to calculate variance and standard deviation of N numbers
11. Write a macro that obtains the largest of three numbers.
12. Write a program to find largest value of two numbers using nesting of member functions.
13. Write a program for shopping list using classes and objects.
14. Write a program to the unary minus operator is overloaded.
15. Write a program to overloading operators using friends.

Relational Data Base Management system

Semester : IV

Subject Code :

Hours per Week: 3

Credits : 3

Objective :

- ♦ This course aims at understanding the RDBMS compiler
- ♦ Trains the students for writing DBMS programs

Unit I

Traditional approach to information processing – Data base approach , Data base definition., Use of database – DBMS – Data definitions languages , data manipulation language.

Unit II

Database models , relational , hierarchical , network database – comparison of models , database , Design problems of DBMS environment.

Unit III

Building a database – creating , opening , database entering data , Retrieving database records – searching the database – EXACT searching – sorting the database.

Unit IV

Editing and modifying database – creating and printing formatted reports – designing custom screen displays – managing number and dates , multiple dat files.

Unit V

File maintenance and performance – memory variables command file creation designing and Writing programs.

Text Books :

1. Computer today , suresh K. Basandra , Galgotia publishing Pvt , Ltd , New Delhi – 11002 – 1995 , Chapter 9.
2. Understanding dbase III plus , Alan Simpson , BPB publishing , B/4 , co naught place, New Delhi – 110001

Ref :

1. Understanding and using dbase III plus – Rob Krumm , IEEE , PHI , Pvt , Ltd , New Delhi – 1994.
2. Principles of database management system – James martin , IEEE PHI , Ltd , New Delhi.

Practical: RDBASE

Semester : IV

Subject Code :

Hours per Week: 2

Credits : 2

Program to generate Fibanoci sequence.

1. Program to find the sum of digits of a given number.
2. Program to check wheather the given string is polyndrome or not.
3. program to make a multiplication table.
4. Program to check a given number is prime or not.
5. Program to count the number of vowels in a given string.
6. Program to process payroll and print payslip of a all employers.
7. Program to process electricity billing and print electricity bill for the consumer.
8. Program to process the marks scored by the students in an University exam and print their mark lists.
9. Program to write a Menu Driven Banking – Teller package that provides the following features : (i) with drawal (ii) Deposit (iii) interest (iv) DB manipulations.
10. Program to write a mean Driven Stock maintance package providing the following features : (i) Listing of stock for condition (ii) Items to be ordered (iii) DM manipulations
11. Program to write a Menu driven program to process stock Inventory control using the transaction file the master file that provides the following features : (i) Isssues (ii) Receipts (iii) cost of Issue calculation (iv) dB manipulation.

Mathematics for Competitive Examination II

Semester : IV

Subject Code :

Hours per Week : 2

Credits :2

Objective :

To enable the students to

- ♦ Attain numerical aptitude skills
- ♦ Attain reasoning aptitude skills
- ♦ Appear in any competitive examinations skills as civil service , TNPSC exams and entrance examinations such as MAT , CAT , SAT , XLRI exams.

Unit I

Time and Work – Pipes and Cistern – Time and distance – Problems on Trains - Boats and streams

Unit II

Alligation of Mixture – Area volume and surface areas – Race and games of skill

Unit III

Permutation and combinations – Probability – heights and distances

Unit IV

Mathematical operations – Arithmetical reasoning – Inserting the missing character

Unit V

Logic – Type I , Type II

Text Book :

1. Quantitative Aptitude for competitive Examinations , R.S Aggarwal – S.Chand & Co , ltd , ISBN : 81-219-0623-6
2. Test of Reasoning , R.S Aggarwal – S.Chand & Co , ltd , ISBN : 81-219-0623-6

Reference Books :

1. Quantitative Aptitude – Tata McGraw Hill
2. Test of Reasoning – Tata McGraw Hill

ALLIED MATHEMATICS – I

Semester : III

Subject Code :

Hours per Week : 5

Credits :5

Objective :

To enable the students to

- ◆ The aim of this course is to enable the students to know the basic concepts of series, trigonometry, theory of Equation, Differentiation, Integration and analytical geometry
- ◆ To enable the students to attain skills to participate in Mathematical competition and competitive examination

◆

Unit I (Algebra)

Summation of series - Binomial, Exponential and logarithmic series

(Problems only)

Unit II (Algebra)

Theory of equations- an n^{th} degree equation has exactly n roots – Relation between the roots and coefficients- Reciprocal equation –Transformation of equation - Newton and Horner's method of finding roots up to 2 decimals.

(chapter 1-section 1.1 to 1.5, p.no.1 to 48)

Unit III (Calculus)

Elements of Differential Calculus (not for examination) - Radius of curvature – Center of curvature (Problems only).

(chapter 3- p.no.65 to 90)

Unit IV

Elements of Integral Calculus (not for examination) - Evaluation of definite integrals – Integration by parts – Reduction formula (chapter 3-section 3.3 to 3.5, p.no.91 to 131)

Unit V (Trigonometry)

De Mover's Theorem – Hyperbolic functions – Logarithms of complex numbers.

(chapter 4 & chapter 5- p.no.143 to 185)

TEXE BOOK:

Ancillary Mathematics I : Dr.Arumugam & Issac – New Gamma publishing house

REFERENCE BOOK:

Ancillary Mathematics II : Manickavasagam pillai & others – S.Viswanathan
Publishing company

ALLIED MATHEMATICS - II

Semester : IV

Subject Code :

Hours per Week : 5

Credits :5

Objective :

To enable the students to

- ◆ The aim of this course is to enable the students to know the basic concepts of Vector differentiation, Vector Integration, Differential equation, application of differential equations
- ◆ To enable the students to attain skills to participate in mathematical competition and competitive examinations

Unit I (Vector calculus)

Vector differentiation - velocity, acceleration –Vector differential operator – gradient – Divergence and curl and their simple properties – Directional derivatives- solenoidal - Irrotational vectors.

Unit II (Vector calculus)

Vector integration – Gauss, Green and Stokes theorems (without proof) Simple applications.

Unit III(Differential Equations)

Differential equations-Equations of first order and first degree – Exact differential equations – integrating factors – Linear equations(chapter 3 fully)

Unit IV

Linear equation with constant coefficients – Methods of finding complementary functions - Second order differential equations with RHS in the form x^n , e^{ax} , $\sin bx$, $\cos bx$, $e^{ax} \sin bx$, $e^{ax} \cos bx$ (chapter 4 fully)

Unit V

Laplace Transforms – Inverse Laplace transform-Solution of differential equations using Laplace transform- Partial differential equations – formations of partial differential equations –Lagrange's equation-Some standard form - $Pp+Qq=R$. (chapter 5&6 fully)

TEXE BOOK:

Ancillary Mathematics II : Dr.Arumugam & Issac – New Gamma publishing house

REFERENCE BOOK:

Ancillary Mathematics II : Manickavasagam pillai & others – S.Viswanathan
Publishing company

Ancillary Mathematics I : Dr.Arumugam & Issac – New Gamma publishing house

OPERATIONS RESEARCH

Semester :V

Hours per Week: 6

Subject Code :

Credits : 5

Objective :

To enable the students

- ◆ to learn the techniques of solving problems of optimization
- ◆ to attain skills to participate in mathematical competitions and competitive examination

Unit I

Mathematical Formulation of LPP – Graphical Solution to LPP - General Linear Programming Problem - Canonical Standard forms LPP - Fundamental Properties of Solution-Simplex Method - Artificial Variable Technique - Big-M-Method (Method of Penalties) - Two Phase Method

(Chapter 2 – 2.2 , 2.3 , 2.5,2.6 and Chapter 3 – 3.1 , 3.2 , 3.5)

Unit II

Concept of Duality - Formulating a Dual Problem - Duality Theorems - Duality and Simplex Method - Dual Simplex Method – The Assignment Problem

(Chapter 4 – 4.1 to 4.6 and Chapter 10 – 10.1 to 10.3)

Unit III

Transportation Problem – Mathematical Formulation – Solution of a Transportation Problem – Initial Basic Feasible Solution – Row Minima – Column Minima - North West Corner Method - Vogel's Approximation Method - Matrix Minima Method – Modi Method – Unbalanced Transportation Problem

(Chapter 9 – 9.1 to 9.9)

Unit IV

Inventory Control - Definition of Inventory - The need of Inventory - Various cost associated with Inventory - Determination of EOQ Under the following determination models with lead time zero

No shortage Instantaneous Production

No Shortage Finite Replacement

Shortage, Production, Rate is Finite

Shortage, Production Rate is Infinite

(Chapter 17 – 17.1 to 17.6)

Unit V

Game theory - Two person zero - Sum games - The maximin minimax principle - Games with saddle point - Solution of games without saddle point using formulae - Graphic solutions of $2 \times n$ and $m \times 2$ games - Dominance property - Solution of games without saddle point by LPP method (Chapter 8 – 8.1 to 8.6, 8.10)

TEXT BOOK :

Operations Research : Kanti Swaroop , P.K.Gupta & Man Mohan
- Sultan Chand & sons – Chennai

REFERNCE BOOK :

Operations Research : V.K.Kapoor – Sultan chand & sons – Chennai

COMPLEX ANALYSIS

Semester :V

Hours per Week: 6

Subject Code :

Credits : 5

Objective :

- ◆ This Course aims at imparting the knowledge of complex functions, its integral calculus
- ◆ To enable the students to attain skills to participate in mathematical competitions and competitive examinations

Unit I

Complex numbers : Introduction – Complex Numbers – Conjugation and Modulus – Inequalities – Square Root – Geometrical Representation of Complex Numbers – n^{th} Roots of Complex Numbers – Circles and Stright Lines – Regions in the Complex Plane – The Extended Complex Plane.
(Chapter 1 –1.0 to 1.9)

Unit II

Analytic Functions: Introduction – Functions of a complex variable – Limits – Theorems on Limit – Continuous Functions – Differentiability – The Cauchy Riemann Equations – Analytic Functions – Harmonic Functions.
(Chapter 2 – 2.0 to 2.8)

Unit III

Bilinear Transformations: Introduction – Elementary Transformations – Bilinear Transformations – Cross Ratio – Fixed Points of Bilinear Transformations – Some Special Bilinear Transformations.
(Chapter 3 – 3.0 to 3.5)

Unit IV

Complex Integration: Definite Integral – Cauchy's Theorem – Cauchy's Integral Formula – Higher Derivatives. Taylors's Series – Laurent's Series.
(Chapter 6 – 6.1 to 6.4 & Chapter 7- 7.1, 7.2)

Unit V

Zeros of an Analytic Function- Singularities – Residues – Cauchy's Residue Theorem – Evaluation of Define Integrals.
(Chapter 7- 7.3 , 7.4 & Chapter 8 – 8.1 ,8.2 ,8.3)

TEXT BOOK:

Complex Analysis: S.Arumugam, A. Thangapandi Isaac & A.Somasundaram
ISBN Number: 8187328681

REFERENCE BOOK :

Complex Analysis: P.Durai Pandian , Laxmi Duraipandian , Mukilan
– Emerald publishers

STATISTICS I

Semester :V

Subject Code :

Hours per Week: 5

Credits : 3

Objective :

To enable the Students

- ♦ to understand the basic concepts of probability, random variables and correlation and regression.
- ♦ to increase their ability to perform well in UGC/CSIR examinations.
- ♦ to create interest in going for research after their post graduation.

Unit I

Central Tendencies –Introduction-Arithmetic mean-partition values(median, quartiles,deciles & percentiles)-Mode-Geometric mean-Harmonic mean-Measures of dispersion-introduction-relative advantages of different averages-Range-quartile deviation-standard deviation. (Chapter 2 & 3)

Unit II

Moments –Introduction-central moment-karl Pearson's β & γ coefficients – karl pearson's coefficient of skewness-Bowley's coefficient of skewness –curve fitting-introduction-principle of least squares-fitting a straight line-fitting a second degree parabola.(Chapter 4 & 5)

Unit III

Correlation and regression-introduction-correlation-karl pearson's coefficient of correlation-Rank correlation-spearman's formula for rank correlation-regression line of y on x-regression line of x on y . Correlation coefficient for a bivariate frequency distribution. (Chapter 6)

Unit IV

Interpolation –Introduction-finite difference-Newton's formula-Lagrange's formula-Theory of attributes-Introduction-attributes-consistency of data-independence (Chapter 7 & 8)

Unit V

Index Numbers-Aggregate method-Average of price relations method-Weighted index numbers-consumer price index numbers-conversion of chain base index number into fixed base index and concisely (Chapter 9)

TEXT BOOK:

Dr.S.Arumugam Isaac - Statistics : New Gamma Publising House.

REFERENCE BOOKS:

- 1.Statistical Methods By S.C. Gupta
- 2.Mathematical Statistics By P.R. Vittal.

MECHANICS

Semester :V
Subject Code :

Hours per Week: 6
Credits : 5

Objective :

To enable the students

- ◆ to learn the various concept in statics and Dynamics
- ◆ to understand parallelogram law of forces like and unlike parallel forces, friction and to study about the projectiles, central orbits
- ◆ to attain skills to participate in mathematical competition and competitive examinations

Unit 1

Forces acting at a point – Parallelogram law of forces - Triangle law of forces – Lami's theorem – Resolution of forces – Theorems on resolved parts – Resultant of any number of coplanar forces – Condition of Equilibrium
(Chapter 2 Fully)

Unit II

Forces acting on a rigid body parallel forces (like & unlike – Moment of a force – Varignon's Theorem (Chapter 3 Fully)

Unit III

Projectiles – Path of a Projectile is a Parabola – Range etc – Range of a particle in an inclined plane etc.(Chapter 6 – 6.1 to 6.16)

Unit IV

Impact, Impulses - Impact in a fixed plane - Direct and Oblique impact
(Chapter 7 – 7.1 to 7.6 & Chapter 8 – 8.1 to 8.9)

Unit V

Central orbits – Components of velocity and Acceleration along and perpendicular to the radius vector – Differential equation of a central orbit – Pedal equation.
(Chapter 11 – 11.1 to 11.11)

TEXT BOOKS :

M.K.Venkatraman - Statics - Agasthiar Publication
M.K.Venkatraman - Dynamics - Agasthiar Publication

REFERENCE BOOK :

P.Durai Pandian ,Laxmi Durai Pandian , Muthamizh Jayaprakash – Mechanics
– S.Chand & Company Ltd -2006 ISBN 81-219-0272 - X

Java Programming

Semester :V

Subject Code :

Hours per Week: 6

Credits : 5

Objectives:

To explore the programming knowledge in language used in internet which is widely used.

Unit I

Java Revolution – java Applets – Revolutionary programming language – Rich Object Environment – Object Oriented Fundamentals – Object Oriented Programming – Object Summary – Java Genesis – Design goals of C++ - how java is better than C++ - java language introduction – Hello World – step by step (Line1,Line 2, Line3) – Lexical Issues – Variables.

Unit II

Data types – Simple types – Arrays – Operators – Flow control – Branching – Looping – Exceptions.

Unit III

Classes – Packages and Interfaces – String Handling – Constructors – Special string syntax – Character Extraction – Comparison – Index of & Last Index of – String copy modifications – Value of – String Buffer – Append – Insert – Strings attached.

Unit IV

Exception handling – Threads and Synchronization – Single – Threaded event loop – The Java Thread Model – Thread Runnable – Thread Priorities – Synchronization – Inter – Thread Communication – Thread API-input/output – File – Input stream – Output stream - File Streams – String Buffer Input Stream – Filtered Streams – Sequence input stream – Bringing streaming I/O – Together – Down stream Benefits. Networking – Inetaddr – datagrams-Sockets “for clients”- Sockets “For Servers” – URL – URL Connection.

Unit V

Applets – Abstract window toolkit – Components – Layout – Menu Components – Event – Imaging.

Text Book:

1. The Java hand book by Patrick Naughton

Reference Books:

1. Java programming by Balagurusamy
2. The Complete Reference Java – 2 by Patrick Naughton & Herbert Schildt.

Chapters:

Unit I – 1,2,3

Unit II – 4,5,6

Unit III – 7,8,9

Unit IV – 10,11,13

Unit V – 14,15,16 & 17

Java Programming Practical

List of Programs

1. Stack
2. Queue
3. Bank Operation
4. Inheritance
5. Polymorphism
6. Merge two files
7. Packages
8. Threads.

Applets

1. Programs showing the use of Key listener, Mouse motion Listener, Item Listener, and Action listener.
2. Design an application form using text box, labels, option buttons & check boxes.
3. Animate text.
4. Animate image.
5. Design a clock
6. Design a calculating Device
7. Draw a figure using Graphics

ORACLE

Semester :V

Subject Code :

Hours per Week: 6

Credits : 5

Objectives:

To explore the programming knowledge in language used in internet which is widely used.

STRUCTURE QUERY LANGUAGE (SQL)

Unit I

Introduction to structure Query Language(SQL) – table fundamentals – create table command – viewing data in the tables – eliminating duplicate rows when using a select statement – sorting data in a tables – creating a table from a table.

(chapter 7 – P.No. 114 to 125)

Unit II

Inserting a data into a table from another table – Delete operations – Updating the contents of a table – modifying a structure of tables – truncating tables – destroying tables. (chapter 7 – P.No. 126 to 131)

Unit III

Data constraints – types of data constraints(primary key and foreign key) – check constraints – computations done on table data.

(chapter 8 – P.No. 138 to 154 & chapter 9 – P.No. 161 to 170)

Unit IV

Oracle functions – date conversion function – date function – grouping data from tables – sub queries – joins – indexes – views – sequences.

(chapter 9 – P.No. 170 to 186 , chapter 10 – P.No. 192 to 220 & chapter 11 – P.No. 254 to 278)

Unit V

Introduction to PL/SQL – Generic PL/SQL block – PL/SQL Execution environment – PL/SQL – control structure. (chapter 15 – P.No. 338 to 349)

Text Book:

- 1.”SQL, PL/SQL the programming Language of Oracle” 4th Revised Edition, IVAN BAYROSS..., BPB Publications.

ORACLE PROGRAMMING LAB

1. Data Definition Language (DDL) commands in SQL.
2. Data Manipulation Language (DML) commands in SQL.
3. Data Control Language(DCL) commands in SQL.
4. creating Tables for Different Applications using DDL.
5. Solving Queries – Date functions, Numeric Functions, and Group Functions.
6. Set operators – Union , Union All, Intersect, Minus.
7. Join Concept – Simple Join, Table Aliases, Self Join, Outer Join, Sub Queries, Multiple Sub queries.
8. Creating PL/SQL block Using all the control statements.
9. Write PL/SQL program to Fibonacci Series
10. Write a PL/SQL program to Factorial Values.
11. Write a PL/SQL program to Armstrong number
12. Write a PL/SQL program to Perfect number.
13. Write a PL/SQL program to Adam number
14. Write a PL/SQL program a Multiplication table.
15. Write a PL/SQL program to Arithmetic Operation

LINEAR ALGEBRA

Semester :VI
Subject Code :

Hours per Week: 6
Credits : 5

Objective :

- ◆ This Course aims at providing the Students with basic concepts of Vector spaces, Inner products spaces and Linear transformations
- ◆ To enable Students to attain skills to participate in mathematical competitions and competitive examinations

Unit I

Vector Spaces : Definition and examples – subspaces – Linear transformation span of a set - Linear independence – Linear dependence. (Chapter 5- 5.1 to 5.5)

Unit II

Basis and Dimension – Rank and Nullity – Matrix of a linear transformation (Chapter 5 - 5.6 to 5.8)

Unit III

Inner Product Spaces : Introduction - Definition and examples – Orthogonality – Orthogonal Complements (Chapter 6 - 6.0 to 6.3)

Unit IV

Theory of Matrices : Introduction – Algebra of matrices – Types of matrices – The Inverse of a matrix – Elementary transformations - Rank of a matrix – Simultaneous linear equations . (Chapter 7 - 7.0 to 7.6)

Unit V

Characteristic equation and Cayley Hamilton theorem – Eigen values and Eigen vectors - Bilinear forms - Introduction – Bilinear forms – Quadratic forms (Chapter 7 - 7.7 & 7.8) and (Chapter 8 - 8.0 to 8.2)

TEXT BOOK :

S.Arumugam & Issac: Modern Algebra – Scitech Publication (Pvt) Ltd – Chennai.
ISBN 81-88429-18-X.

REFERENCE BOOK :

Introduction to Linear Algebra: V. Krishna Moorthy , V.P.Manira ,J.L Arora
– Affiliated East - West Press Pvt Ltd

AUTOMATA THEORY

Semester :VI
Subject Code :

Hours per Week: 6
Credits : 5

Objective:

To enable the students

- ◆ to understand basic concepts of automata theory and formal languages.
- ◆ to create awareness among the students about the current developments in mathematics.
- ◆ to attain skills to participate in mathematical competition and competitive examinations

Unit I

Definition of Language-Finite State System-Deterministic Finite Automata(DFA)-Non Deterministic Finite Automata(NFA or NDFA)-The equivalence of DFA and the NFA-NFA with ε moves- NFA with ε moves to DFA-Minimization of DFA. (Chapter 2 - 2.1 to 2.8)

Unit II

Definition of Regular Expression-Equivalence of Finite Automata and Regular Expression-Equivalence between Two Regular Expressions-Arden's Method for Constructing Regular Expression from DFA-Proving Languages not be Regular-Applications of Regular Expression and Finite Automata. (Chapter 3 - 3.1 to 3.6)

Unit III

Context Free Grammar (CFG)-Derivation and Languages-Derivation Trees-Relationship between Derivation and Derivation Tree-Ambiguity-Simplification of CFG. (Chapter 4 - 4.1 to 4.6)

Unit IV

Definition of Pushdown Automata-Instantaneous Description-Deterministic Pushdown Automata-Context Free Grammar and Pushdown Automata. (Chapter 5 - 5.1 to 5.4)

Unit V

Normal Forms-Chomsky's Normal Form(CNF)- Greibach Normal Form(GNF) - Applications of Context Free Grammar-Pumping Lemma for CFL-Closure Properties of CFL. (Chapter 6 - 6.1 to 6.4)

TEXT BOOKS:

Theory of Computation: A.A.Puntambekar Technical Publications, Pune

ISBN NO : 81-8431-010

REFERENCE BOOKS :

- 1.Theory of Computer Science: K.L.P. Mishra, Professor, Dept of electrical and Electronics Engineering Regional Engineering College, Trichy & Chandrasekaran, Professor of Mathematics, St Joseph's College, Trichy - Prentice – Hall of India Private Ltd, New Delhi –110001.
2. Automata Theory & Formal Languages by Rani Sironmony.
3. Introduction to Automata theory : John E.Hopcraft & Jeffrey – D.Ulman – Narosa Publishing House

GRAPH THEORY

Semester :VI
Subject Code :

Hours per Week: 6
Credits : 5

Objective :

To enable the students

- ♦ to learn the fundamentals of Graph theory
- ♦ to acquire knowledge and understand the techniques of different topics in the Graph Theory.
- ♦ to attain skills to participate in mathematical competition and competitive examinations

Unit I

Graphs and Subgraphs : Definition and Examples – Degrees – Subgraphs – Isomorphism – Ramsey Numbers – Independent Sets and Coverings – Intersection Graphs and Line Graphs – Matrices – Operations on Graphs.(Chapter 2 – 2.1 to 2.9)

Unit II

Degree Sequences – Graphic Sequences –Characterisation of Trees – Centre of a Tree – Matchings – Matchings in Bipartite Graphs.(Chapter 3 – 3.1 , 3.2 , Chapter 6 – 6.1 to 6.2 , Chapter 7 – 7.1 to 7.2)

Unit III

Walks , Trails and Paths – Connectedness and Components – Blocks – Connectivity (Chapter 4 – 4.1 to 4.4)

Unit IV

Eulerian Graphs – Hamiltonian Graphs – Planar graphs-Definition and Properties – Characterization of Planar Graphs. (Chapter 5 – 5.1 to 5.2 , Chapter 8 – 8.1 to 8.2)

Unit V

Chromatic Number and Chromatic Index – The five colour theorem-Four Color Problem – Chromatic Polynomials. (Chapter 9 – 9.1 to 9.4)

TEXT BOOK:

S.Arumugam and S.Ramachandran – Invitation to Graph Theory – Scitech Publications, Chennai-17.

REFERENCE BOOKS :

- 1.Graph Theory: K.R.Parhasarathy – Tata Mcgraw Hill Publishing company (p) Ltd
- NewDelhi
- 2.Graph Theory : S.Kumaravelu, Mrs.Susila Kumaravelu – SKV Publications, Nagar
Koil

STATISTICS II

Semester :VI
Subject Code :

Hours per Week: 5
Credits : 4

Objective :

To enable the Students

- ◆ to understand the basic concepts of distributions, large and small samples and analysis of variance.
- ◆ to increase their ability to perform well in UGC/CSIR examinations.
- ◆ to create interest in going for research after their post graduation.

Unit I

Probability – conditional probability-Random variables-Discrete random variables- Continuous random variables- mathematical expectations – Moment generating function- Characteristic function (Chapter 11 – 11.0 to 11.2 & Chapter 12 – 12.0 to 12.6)

Unit II

Some Special Distributions- Binomial distribution-Poisson distribution- Normal distribution – Some more continuous distributions. (Chapter 13 – 13.0 to 13.4)

Unit III

Test of Significance (Large and Small samples). Sampling- Sampling distribution- Test of hypothesis-Procedure- Test of significance for large sample – small samples- Test of significance based on t-distribution- Test of significance based on F test- Test for significance of an observed sample correlation(Chapter 14 – 14.0 to 14.5 & Chapter 15 – 15.0 to 15.3)

Unit IV

Test Based on χ^2 Distribution- Introduction - χ^2 -test for population variance - χ^2 -test to test the goodness of fit- test for independence of attributes. (Chapter 16 – 16.0 to 16.3)

Unit V

Analysis of Variance- Introduction – one criterion of classification- two criteria of classification- Three criteria of classification (Latin square) (Chapter 17 – 17.0 to 17.3)

TEXT BOOK:

Statistics : Dr.S.Arumugam Isaac , New Gamma Publising House.

REFERENCE BOOKS:

1. Statistical methods By S.C. Gupta
2. Mathematical statistics By P.R. Vittal

NUMERICAL ANALYSIS

Semester :VI

Subject Code :

Hours per Week: 5

Credits : 3

Objective:

- ◆ This course is to help the students to understand the systematic manner the most important principles, methods and process used for obtaining numerical results
- ◆ To enable the students to attain skills to participate in mathematical competition and competitive examination

Unit I

Numerical Solution of Algebraic and Transcendental Equation – Iteration Method-Newton – Raphson Method – Method of False Position - Solution of Simultaneous Linear Equation – Gauss Iteration Method-Gauss Seidel Method (Chapter 1 - 1.1 , 1.2, 1.4 to 1.6, chapter 2-2.1 to 2.7)

Unit II

Finite Differences-Forward Differences - Backward Differences - Operators - Relation-Properties - Finding Missing Terms - Inverse Operators- Factorial Notation (Chapter 3 - 3.1, 3.2)

Unit III

Interpolation - Newton's Forward and Backward Formula - Divided Differences and their properties - Newton's Divided Difference Formula - Gauss's Formula – Stirling's Formula – Bessel's Formula - Laplace – Everett's formula – Lagrange's Formula - Simple problems. (Chapter 4 - 4.1 to 4.5)

Unit IV

Numerical differentiation – Finding the first and second order derivatives Maximum and Minimum value of a function for the given data (Chapter 5- 5.1 to 5.4)

Unit V

Numerical integration – Newton's - Cote's formula – Trapezoidal rule - Simpson's one-third rule - Simpson's three eight rule – Weddley's rule (Chapter 6 - 6.1 to 6.6)

TEXT BOOK:

S.Arumugam , A.Somasundaram, A.Thangapandi Issac :Numerical Analysis, New Gamma Publishing House.

REFERENCE BOOK:

P.Kandasamy, K.Thilagavathy, K.Gunavathy - S.Chand & sons company – Newdelhi: Numerical Method
S.Narayanan & T.K.Manickavasagampillai – S.Viswanathan publishing company : Numerical Analysis

**ALLIED MATHEMATICS
PAPER III**

Semester :V

Hours per Week: 5

Subject Code :

Credits : 5

Objective:

- ♦ The aim of this course is to enable the students to know the basic concepts of complex analysis, Statistics, Matrices, Groups, Fourier series
- ♦ To enable the students to attain skills to participate in mathematical competition and competitive examinations

Unit I (Complex Analysis)

Analytic function – C - R equations (no proof) and its applications – Bilinear Transformation – Cross Ratio – Fixed Points (Chapter 1 & 2)

Unit II (Statistics)

Correlation Coefficient – Rank Correlation Coefficient - Interpolation Lagrange and Newton methods (Chapter 3 & 4)

Unit III (Statistics)

Attributes – Index numbers. (Chapter 5 & 6)

Unit IV (Algebra)

Matrices – Rank – Consistency of equation – Solution of equations – Eigen values and Eigen vectors. (Chapter 7)

Unit V

Group – axioms, Abelian groups – Permutation groups– Cyclic groups – Lagrange's theorem (very simple problems). (Chapter 8)

TEXT BOOK :

Ancillary Mathematics III : Dr.Arumugam & Issac – New Gamma Publishing House

REFERENCE BOOK :

Ancillary Mathematics III: Sankaranarayanam & Mangaldoss – Suja Publishing House

ALLIED MATHEMATICS
PAPER IV

Semester :V

Hours per Week: 6

Subject Code :

Credits : 5

Objective :

- ◆ The aim of this course is to enable the students to know the basic concept of formulating LPP, assignment problem, Transportation problem, simplex method, Big M method, two phase method and duality
- ◆ To enable the students to attain skills to participate in mathematical competition and competitive examinations

Unit I

Definition, Nature and scope of OR, OR models – Their construction and solution, Definition of a standard Linear programming problem – Definition of feasible solution, optimum basic feasible solution, degenerate solution of a LPP mathematical formulation of a LPP – slack and surplus variables – Graphical solution of a LPP – Simplex method using slack variables.

(Chapter 3 – 3.1 to 3.5 P.No:3.1 to 3.115)

Unit II

Solving of LPP by Charne's method of penalties – The concept of duality – Formation of the dual LPP when the variables of the primal are non-negative – The dual of the dual is the primal (Chapter 3 – P.No: 3.116 to 3.148 , P.No: 3.181 to 3.218)

Unit III

Mathematical formulation of assignment problem – Unbalanced assignment problem and its solution (Chapter 5 – P.No 5.1 to 5.25)

Unit IV

Finding feasible Solution by (1) North - west corner method (2) Vogel's Approximation method (3) Least Cost Method – Optimal solution of transportation problem (only Balanced T.P) (Chapter 4 – P.No: 4.1 to 4.37)

Unit V

Game theory – Two Person Zero Sum games – The Maximin minimax principle – Games with saddle point – Solution of games without saddle point using formulae (Chapter 16 – 16.1 to 16.4)

TEXT BOOK :

Ancillary Mathematics IV : Dr.Arumugam & Issac – New Gamma publishing house
Operation Research : V.Sundaresan, K.S.Ganapathy Subramanian,
K.Ganesan – A.R.Publications.

REFERENCE BOOK :

Operations Research : Kanit swaroop & others

Department of Mathematics
Yadava College – Madurai
Certificate Courses on Operation Research

Duration: 3 Months

Hours per Week: 30

Objective:

- ◆ The aim of this course is to enable the students to know the basic concepts of formulating LPP, assignment problem, Transportation problem, simplex method, Big M method, two phase method and duality
- ◆ To enable the students to attain skills to participate in mathematical competition and competitive examinations

Unit I

Definition, Nature and scope of OR, OR models – Their construction and solution, Definition of a standard Linear programming problem – Definition of feasible solution, optimum basic feasible solution, degenerate solution of a LPP mathematical formulation of a LPP – slack and surplus variables – Graphical solution of a LPP.

Unit II

Solution of LPP – simplex Method using slack and surplus variable – Two phase Method – Big M method.

Unit III

Assignment problem: Mathematical formulation of assignment problem – Unbalanced assignment problem and its solution

Unit IV

Transportation Problem: Finding feasible Solution by (1) North - west corner method (2) Vogel's Approximation method (3) Least Cost Method – Optimal solution of transportation problem (only Balanced T.P)

Unit V

Game theory – Two person zero – Sum games – The Maximin minimax principle – Games with saddle point – Solution of games without saddle point using formulae

TEXT BOOK:

Operation Research: V.Sundaresan, K.S.Ganapathy Subramanian,
K.Ganesan – A.R.Publications.

REFERENCE BOOK:

Operations Research: Kanit swaroop & others

SELF STUDY PAPER

ASTRONOMY

B.Sc Mathematics

Sub.Code:

Credit: 3

Semester : IV

OBJECTIVES:

- To create an interest and to know about the universe
- To appreciate the nature realizing the Gift of Good and to have a better learning experience
- To enable the students to set up and focus the telescope
- To locate the position to the planets and constellations
- To prepare the star maps

COURSE OUTLINE:

UNIT 1: Celestial Spheres

UNIT 2: The Earth

UNIT 3: Calendar

UNIT 4: The Moon

UNIT 5: Eclipses

Text Book:

S.Kumaravelu & Susheela , Astronomy , 1999 , Nagercoil.

SELF STUDY PAPER
FRACTALS AND CHAOS THEORY
B.Sc Mathematics

Sub.Code:

Credit: 5

Semester: IV

COURSE OUTLINE:

UNIT I:

General introduction to chaos theory, Evolution of Chaos Theory, Examples of Chaos and Fractals in nature.

UNIT II

Elementary transformations :

Translations , Rotation in two and three dimensions. Symmetry about a point, about a line , about a plane , projection on a plane , symmetry in nature , simple examples.

UNIT III

Fractals: Definition, fractals of different dimensions, cantor dust, fractals shore , Koch Snowflakes ,Sierpinski gasket, Sierpinski carpet , Menger sponge Sierpinski Triangle , Hexagon and pentagon.

UNIT IV

Patterns created by Mandelbrot sets , Calculation of fractal dimension, proof of box counting theorem, simple problems.

UNIT V

Examples of chaos in the light of fractals, butterfly effect, strange Attractors in nature.

TEXT BOOK:

Arvind Kumar , Chaos Fractals and Self Organization, 1996 , National Book Trust , New Delhi.

SELF STUDY PAPER

Discrete Mathematics

B.Sc Mathematics

Sub.Code:

Credit: 5

Semester: V

COURSE OUTLINE:

UNIT I:

Mathematical Logic: Introduction – Propositions Logical Operators – logical Operators – Truth Table – construction of Truth Tables – Tautologies and Contradictions – Equivalence and Implications – NAND and NOR. (Chapter 3 – 93 to 115)

UNIT II

Mathematical Logic: Functionally Complete Sets – Two state Devices and Statement Logic – Normal Forms – Predicate Calculus – Statement Calculus – Free and Bound Variables – Quantifiers – Universal Specification – Rule CP (Conditional Proof) (Chapter 3 – 117 to 143)

Unit III

Induction , Recursion and Recurrence Relations : Introduction – Mathematical Induction – Principle of Mathematical Induction – Recursion – Recursion and Iteration – Closed Form Expression – Sequence of Integers. (Chapter 4 – 147 to 156)

UNIT IV

Induction , Recursion and Recurrence Relations : Recurrence Relations – Recurrence Relations Obtained from Solutions – Solving Linear Homogeneous Recurrence Relations - Solving Linear Non-homogeneous Recurrence Relations – Generating Functions – Solution of Recurrence Relation using Generating Function. (Chapter 4 – 158 to 170)

UNIT V

Lattices and Boolean Algebra: Introduction – Partially Ordered Sets – Hasse Diagram of Partially Ordered Sets – Lattices (Chapter 6 – 231 to 237)

TEXT BOOK:

Discrete Mathematics - N.Ch.S.N.Iyengar , V.M.Chandrasekaran , K.A.Venkatesh , P.S.Arunachalam , Vikas Publishing House Pvt Ltd.

SELF STUDY PAPER

Integral Transforms

B.Sc Mathematics

Sub.Code:

Credit: 5

Semester: VI

COURSE OUTLINE:

UNIT I:

Fourier Transforms: Introduction – Fourier Integral Theorem – Fourier Transforms – Alternative Form of Fourier Complex Integral Formula – Relationship Between Fourier Transform and Laplace Transform (Chapter 3 – Section 3.1 to 3.5)

UNIT II

Fourier Transforms: Properties of Fourier Transforms – Finite Fourier Transforms. (Chapter 3 – Section 3.6 to 3.7)

UNIT III

Laplace Transforms : Laplace Transforms of Periodic Functions – Derivatives and Integrals of Transforms – Laplace Transforms of Derivatives and Integrals – Initial and Final Value Theorems. (Chapter 4 – Section 4.6 to 4.9)

UNIT IV

Laplace Transforms : The Convolution – Solution of Differential and Integral (Chapter 4 – Section 4.10 to 4.11)

Equations

UNIT V

Z- Transforms : Introduction – Properties of Z-Transforms – Z-Transforms of Some Basic Functions. (Chapter 5 – Section 5.1 to 5.3)

TEXT BOOKS:

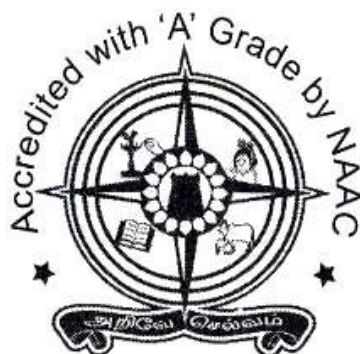
Partial Differential Equations and Integral Transforms - T.Veerarajan ,Tata McGraw-Hill Publishing Company Limited.

YADAVA COLLEGE (Autonomous)

Govindarajan Campus, Thiruppalai

Madurai - 625 014

Department of Mathematics



M.Sc., Degree course in Mathematics

CBCS (2015 – 2016)

Course Profile

Final Copy of syllabus incorporating all suggestions made in the
meeting of Board of studies held on 06.04.2015

DEPARTMENT OF MATHEMATICS
POSTGRADUATE PROGRAMME

(w.e.f. 2015 –2016)

COURSE CONTENT
Choice Based Credit System

Semester	Title of the Papers	Teaching hour per week
I	Algebra I	6
	Real Analysis	6
	Differential Equation	6
	Mechanics	6
	Elective I (From List I)	6
II	Algebra II	6
	Topology	6
	Measure Theory	6
	Graph Theory	6
	Elective II (From List II)	6
III	Algebra III	6
	Statistics	6
	Complex Analysis	6
	Fuzzy Mathematics	6
	Elective – III (From List III)	6
IV	Measure Theory	6
	Functional Analysis	6
	Number Theory	6
	Calculus of Variations and Linear Integral Equations	6
	Elective –IV (From List IV)	6

DEPARTMENT OF MATHEMATICS**POSTGRADUATE PROGRAMME****(w.e.f. 2015 –2016) COURSE CONTENT****Choice Based Credit System**

Sem	Title of Papers	Teaching hours/ week	Credits	Evaluation		Duration of Exam
				Internal	External	
I	Algebra I	6	4	25	75	3
	Real Analysis	6	5	25	75	3
	Differential Equation	6	4	25	75	3
	Mechanics	6	4	25	75	3
	Elective I (From List I)	6	5	25	75	3
II	Algebra II	6	5	25	75	3
	Topology	6	4	25	75	3
	Measure Theory	6	4	25	75	3
	Graph Theory	6	4	25	75	3
	Elective II (From List II)	6	5	25	75	3
III	Algebra III	6	5	25	75	3
	Statistics	6	4	25	75	3
	Complex Analysis	6	4	25	75	3
	Fuzzy Mathematics	6	4	25	75	3
	Elective III (From List III)	6	5	25	75	3
IV	Measure Theory	6	4	25	75	3
	Functional Analysis	6	5	25	75	3
	Number Theory	6	4	25	75	3
	Calculus of Variations and Linear Integral Equations	6	5	25	75	3
	Elective IV (From List IV)	6	5	25	75	3

List I	Major Electives
	Differential Geometry
	Automata Theory & Formal Languages
	Modern Applied Algebra
List II	Major Electives
	Operation Research
	Combinatorial Mathematics
	Visual Basic with Practical
List III	Major Electives
	Numerical Analysis with C program
	Bio Statistics
	Business Statistics
List IV	Major Electives
	Stochastic Process
	Econometrics
	Number Theory & Cryptography

Department of Mathematics
YADAVA COLLEGE
CBCS Question Paper Pattern
Post graduate Courses

Time : 3 Hours

Max.Marks:75

Section A

Answer any **FIVE** questions only

(5×2=10 Marks)

Five questions to be answered from Eight questions

(Atleast one questions from each unit and not exceeding two questions from each unit)

Section B

Answer any **FIVE** questions only

(5×4=20 Marks)

Five questions to be answered from Eight questions

(Atleast one questions from each unit and not exceeding two questions from each unit)

Section C

Answer any **THREE** questions only

(3×15=45 Marks)

Three questions to be answered from Five questions

(One questions from each unit)

The Serial No. of the questions has to be continuous from 1 to 21 from Section A to Section C

ALGEBRA I

Semester : I

Subject Code:

Contact hours per week:6

Credit : 4

Objectives :

To enable the students to

- ◆ understand the concepts in Group Theory, Ring Theory and Modules
- ◆ increase their ability to perform well in UGC / CSIR and other competitive examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Review of elementary properties of groups (not for examination) -Another Counting principle – Conjugacy is an equivalence relation - Normalizer - Center of a group G-Cauchy theorem - Sylows theorem - first, second and third parts

(Sections 2.11 &2.12 of Chapter 2 in I.N.Herstein)

UNIT II

Direct products -Internal direct product - Finite abelian groups - Properties
(Sections 2.13 &2.14 of Chapter 2 in I.N.Herstein)

UNIT III

Review of basic properties of rings (not for examination) Euclidean rings - unit element and associates of Euclidean ring – $J[I]$ is a Euclidean ring
(Section 3.7&3.8 of Chapter 3 in I.N.Herstein)

UNIT IV

Polynomial rings – Polynomial over the rational field – Polynomial rings over Commutative rings - Unique factorization domain - Modules - Submodules and cyclic sub modules

(Section 3.11 , 3.11 &4.5of Chapter in I.N.Herstein)

UNIT V

Solvable groups – Subnormal, Normal and composition series – Maximal normal subgroup – Butterfly theorem – Schreier's refinement theorem - Jordan –Holder theorems.

(Chapter 5 in surjeet singh and qazi zameeruddin)

TEXT BOOK :

1.Topics is Algebra

I.N.Herstein John Wiley and Sons

ISBN 9-971-51-253-X

2.Modern Algebra

Surjeet singh and Zameeruddin - Vikas

Publishing pvt Ltd, 1998 , New Delhi.

REFERENCE BOOKS:

A first course in Abstract Algebra: John.B.Fraleigh. - Addison - Wesley Publishing Company.

Real Analysis I

Subject Code :

Semester : I

Hours per Week : 6

Credits :5

Objectives :

To enable the students to

- ◆ understand the basic concepts and to make the students familiar with importance of mathematical analysis such as convergence, continuity and differentiation
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I

The real and Complex Number Systems: Introduction-Ordered Sets – Fields - The Real Field – The Extended Real Number System – The Complex Field – Euclidean Spaces – Finite, Countable , and Uncountable Sets – Metric Spaces.(Chapter 1 full and Section 1,2 in Chapter 2)

Unit II

Basic Topology: Compact Sets – Perfect Sets – Connected Sets. (Section 3,4,5 in Chapter 2)

Unit III

Numerical Sequences and Series: Convergent Sequences – Subsequences – Cauchy Sequences – Upper and Lower Limits – Some Special Sequences – Series. (Section 1,2,3,4,5,6 in Chapter 3)

Unit IV

Numerical Sequences and 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.(Section 7,8,9,10,11,12,13, 14 in Chapter 3)

Unit V

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

Text Book:

Principles of Mathematical Analysis: Walter Rudin, Third Edition, by McGraw –Hill book company.

REFERENCE BOOKS :

Methods of Real Analysis (1975) : R.R.Goldberg - Oxford and IBH Publishing House.

Mathematical Analysis (1977) : T.M.Apostol - Addison Wesley Publishing House.

DIFFERENTIAL EQUATIONS

Semester I

Subject Code:

Contact hours per week : 6

Credit : 4

Objectives :

To enable the students to

- ◆ understand the basic concepts of homogeneous equations and the partial differential equations
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Introduction – Initial value problems for the homogeneous equation – Solutions of the homogeneous equation – The Wronskian and linear independence – Reduction of the order of a homogeneous equation – The non homogeneous equation.

(Section 3.1 to 3.6 of chapter 3 in Earl A.Coddington)

UNIT II

The Legendre equation – Introduction of linear equations with regular singular points - The Euler equation – Second order equations with regular singular points – an Example (Section 3.8 of chapter 3 & Section 4.1 to 4.3 of chapter 4 in Earl A.Coddington)

UNIT III

The Bessel equation - The Bessel equation (continued)- Introduction of first order equations - Equations with variables separated - Exact equations.

(Section 4.7 of chapter 4 & Section 5.1 to 5.3 of chapter 5 in Earl A.Coddington)

UNIT IV

The method of successive approximations – The Lipschitz condition – Convergence of the successive approximations.

(Section 5.4 to 5.6 of chapter 5 in Earl A.Coddington)

UNIT V

Partial differential equations – Origins of first - order partial differential equations - Cauchy's problem for first - order equations – Linear equations of the first order – Integral surfaces passing through a given curve – Surface orthogonal to given system of

surfaces – Non linear partial differential equations of the first order – Cauchy's method of Characteristics – Compatible systems of first order equations – Charpit's method – Special types of first order equations.

(Section 2.1 to 2.11 of chapter 2 in IAN .Sneddon)

TEXT BOOK:

Differential Equation :Earl A. Coddington Prentice-Hall of India Private Limited

Elements of Partial Differential Equations : Ian Sneddon Mc Graw-Hill

ISBN 81-203-0361-X

REFERENCE BOOK :

Ordinary Differential Equation : S.G.Deo,V.Raghavendra Prentice Tata McGraw-Hill

Partial Differential Equation : K.Sankara Rao Prentice – Hall of India

DIFFERENTIAL GEOMETRY

Semester : I

Subject Code:

Contact hours per week:6

Credit : 5

Objectives :

To enable the students to

- ◆ understand the various types of plane curves, space curves, surfaces and their properties
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Introductory remarks about space curves – Definitions - Arc length - Tangent, normal and binormal - Curvature and torsion of a curve given as the intersection of two surfaces - contact between curves and surfaces.(Chapter 1 – Section 1 to 6)

UNIT II

Definition of a surface - Curves on a surface - Surfaces of revolution - Helicoids – metric - Direction coefficients - Families of curves. .(Chapter 2 – Section 1 to 7)

UNIT III

Geodesics - Canonical geodesic equations - Normal property of geodesic - Geodesic parallels - Geodesic curvature - Liouville's Formula.
(Chapter 3 – Section 10,11,12,14,15)

UNIT IV

Gauss Bonnet theorem - Gaussian curvature, surface of constant curvature, conformal mapping, Geodesic mapping - The second fundamental form - Principal curvatures - Line of curvature.

(Chapter 2 – Section 16 to 20 & Chapter 3- Sections 1,2 &3)

UNIT V

Developables - Developables associated with space curves – Developables associated with curves on surfaces - Minimal surfaces - Ruled surfaces. (Chapter 3 – Section 4 to 8)

TEXT BOOK:

1. An introduction to Differential Geometry T.J. Willmore.

Oxford University Press. ISBN 6 -19 - 561110 -1

REFERENCE BOOKS:

Differential Geometry Mittal and Agarwal - Krishna Prakashan Media Pvt Ltd,
Meerut. Differential Geometry M.L. Khanna - Jai Prakash Nath
and Co Publishers.

MECHANICS

Semester : I

Subject Code:

Contact hours per week:6

Credit : 4

Objectives :

To enable the students to

- ◆ learn the various concepts in Mechanics
- ◆ Understand D'Alembert's Principle and Lagrange's formulation and its applications of classical mechanics and to study the central force problems.
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Mechanics of a particle – Mechanics of a system of particles – Constraints - D'Alembert's principle and Lagrange's equations – Velocity - Dependent potentials and the dissipation function

(Section 1.1 to 1.5 of chapter 1)

UNIT II

Simple applications of the Lagrangian formulation – Hamilton's principle – some techniques of the calculus of variations - Derivation of Lagrange's equations from Hamilton's principle

(Section 1.6 of chapter 1 & Section 2.1 to 2.3 chapter 2)

UNIT III

Extension of Hamilton's Principle to non holonomic systems - Advantages of a variational principle formulation - Conservation theorems and symmetry properties - Reduction to the equivalent one body problem

(Section 2.4 to 2.6 of chapter 2 & Section 3.1 chapter 3)

UNIT IV

The Equations of motion and first integrals - The equivalent one dimensional problem, and classification of orbits - The virial theorem - The differential equation for the orbit, and integrable power - Law potentials

(Section 3.2 to 3.5 of chapter 3)

UNIT V

Condition for closed orbits (Bertrand's Theorem) - The Kepler problem - Inverse square law of force - The motion in time in the Kepler problem - The Laplace –Runge-Lenz vector.

(Section 3.6 to 3.9 of chapter 3)

TEXT BOOK :

Classical Mechanics Herbert Goldstein - second Edition, Addition

Wesley /Narosa Chapter 1,2 and Chapter 3 Section 1-9 Narosa publishing
House, New Delhi.ISBN 81-85015-53-8

REFERENCE BOOK:

Classical Mechanics :B.D.Gupta, Sathyaprakash Publisher Kedar Nath,Ramnath

Automata Theory and Formal Language

Semester: I

Subject Code:

Contact hours per week:6

Credit :5

Unit I

Why study automata theory? Introduction to formal proof, Additional forms of proof, Inductive proofs, The central concepts of Automata theory
(Chapter 1, Sections 1.1 to 1.5)

Unit II

An informal picture of finite automata, Deterministic finite automata, Non-deterministic finite automata, An application: Text search, Finite automata with epsilon transitions
(Chapter 2 Section 2.1 to 2.5)

Unit III

Regular expressions, Finite automata and regular expressions, Applications of regular expressions, Algebraic laws of regular expressions
(Chapter 3, Sections 3.1 to 3.4)

Unit IV

Proving languages are not regular, Closure properties of regular languages, Decision properties of regular languages, Equivalence and Minimization of automata
(Chapter 4, Sections 4.1 to 4.4)

Unit V

Context - free grammars, Parse trees, Applications of context - free grammar, Ambiguity in grammars and languages, Definition of Push Down Automata, Languages of PDA , Equivalence of PDA's and CFG's, Deterministic PDA
(Chapter 5, Sections 5.1 to 5.4 and Chapter 6, Sections 6.1 to 6.4)

Text Book:

Introduction to Automata, Languages, and Computation, II Edition by J.E.Hopcroft , R.Motwani, and J.D.Ullman , Pearson Edition, 2001

Chapter 1: Sections 1.1 to 1.5, Chapter 2: Sections 2.1 to 2.5

Chapter 3: Sections 3.1 to 3.4, Chapter 4: Sections 4.1 to 4.4

Chapter 5: Sections 5.1 to 5.4, Chapter 6: Sections 6.1 to 6.4

Modern Applied Algebra

Semester: I

Subject Code:

Contact hours per week:6

Credit :5

Unit I

Introduction, Binary devices and states, Finite - state machines, Covering and equivalence, Equivalence states, A minimization procedure, Turing machines, Incompletely specified machines (Chapter 3: Sections 3.1 to 3.9)

Unit II

Introduction, Arithmetic expressions, Identifiers: assignment statements, Arrays, For statements, Block structures in ALGOL, The ALGOL grammar, Evaluating arithmetic statements, compiling arithmetic expressions.
(Chapter 4: Sections 4.1 to 4.9)

Unit III

Introduction, Order, Boolean polynomials, Block diagrams for gating networks, Connections with logic, Logical capabilities of ALGOL , Boolean applications, Boolean subalgebras, Disjunctive normal form, direct products, morphism
(Chapter 5: Sections 5.1 to 5.10)

Unit IV

Introduction, Optimization, computerizing optimization, Logic design, NAND gates and NOR gates, The minimization problem, Procedure for deriving prime implicants, Consensus taking, Flip – flops, Sequential machine design
(Chapter 6: Sections 6.1 to 6.10)

Unit V

Introduction, Encoding and decoding, Block codes, Matrix encoding techniques, Group codes, decoding tables, Hamming codes (Chapter 8: Sections 8.1 to 8.7)

Text Book:

Modern Applied Algebra by G.Birkhoff and T.C.Bartee, CBS Publishers and Distributors, New Delhi ,1987

Chapter 3 : Sections 3.1 to 3.9 , Chapter 4: Sections 4.1 to 4.9

Chapter 5 : Sections 5.1 to 5.10 , Chapter 6: Sections 6.1 to 6.10

Chapter 8 : Sections 8.1 to 8.7

ALGEBRA II

Semester : II

Subject Code:

Contact hours per week:6

Credit : 5

Objectives :

To enable the students to

- ◆ acquire deep knowledge in Vector spaces, Linear Transformations, canonical forms and matrices
- ◆ increase their ability to perform well in UGC / CSIR and other competitive examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Review of elementary properties of Vector spaces(not for examination)

Dual Space – Homomorphism - $\text{Hom}(V, W)$ is a vector space - Annihilator – Properties - Linear transformations-Algebra of linear transformation - Invertible regular and singular transformations

(Sections 4.3 of Chapter 4 & 6.1 of Chapter 6 in I. N.Herstein)

UNIT II

Characteristic roots - Characteristic vectors – Matrices - Matrix of a linear transformation $m(T)$ - Properties

(Sections 6.2 & 6.3 of Chapter 6 in I. N.Herstein)

UNIT III

Canonical forms - Triangular form - Invariant subspace - Minimal polynomials - Nilpotent transformations

(Sections 6.4&6.5 of Chapter 6 in I. N.Herstein)

UNIT IV

Canonical forms - Jordan forms – Jordan block – Rational canonical form companion matrix.(Sections 6.6&6.7 of Chapter 6 in I. N.Herstein)

UNIT V

Trace and transpose of a matrix - Symmetric and adjoint matrix – Hermitian, unitary and normal transformations.

(Sections 6.8&6.10 of Chapter 6 in I. N.Herstein)

TEXT BOOK :

Topics in Algebra I. N. Herstein - University of Chicago, John Wiley & Sons
ISBN 9971-51-253-X

REFERENCE BOOK :

Linear Algebra : Kenneth Hoffman & Ray Kunze - Prentice – Hall of India pvt Ltd

Real Analysis II

Semester : II

Subject Code :

Hours per Week : 6

Credits :5

Objectives :

To enable the students to

- ◆ understand the basic concepts and to make the students familiar with importance of mathematical analysis such as convergence, continuity and differentiation
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I

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.(Chapter 5 full)

Unit II

The Riemann-Stieltjes Integral: Definition and Existence of the Integral – Properties of the integral – Integration and Differentiation – Integration of Vector-valued Functions – Rectifiable Curves.(Chapter 6 full)

Unit III

Discussion of Main Problem – Uniform Convergence – Uniform Convergence and Continuity.(Section 1,2,3 of Chapter 7)

Unit IV

Uniform Convergence and Integration – Uniform Convergence and Differentiation – Equicontinuous Families of Functions – The Stone –Weierstrass Theorem.(Section 4,5,6,7 of Chapter 7)

Unit V

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.(Chapter 8 full)

Text Book:

Principles of Mathematical Analysis: Walter Rudin, Third Edition,
McGraw-Hill book co.

REFERENCE BOOKS :

Methods of Real Analysis (1975) : R.R.Goldberg - Oxford and IBH Publishing House.

Mathematical Analysis (1977) : T.M.Apostol - Addison Wesley Publishing House.

TOPOLOGY

Semester II

Subject Code:

Contact hour per week : 6

Credit : 4

Objectives :

To enable the students to

- ◆ understand the basic concepts and theorems in Topology
- ◆ understand and appreciate the under-link between Topology and Metric Spaces
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Review of chapter 1 (not for examinations) Topological Spaces - Basis for 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 - The Metric topology (continued) - Uniform limit theorems. (Section 12,13,14,15,16,17,18,19,20,21 of chapter 2)

UNIT II

Connectedness and Compactness : Connected spaces - Connected subspace of the Real Line – Extreme value theorem – The lebesgue number lemma-Components and Local connectedness. (Section 23,24,25 of chapter 3)

UNIT III

Compact spaces - Compact subspace of the Real Line - Extreme value theorem – The lebesgue number lemma-Limit point compactness - Local compactness. (Section 26,27,28,29 of chapter 3)

UNIT IV

The Countability Axioms - The Separation Axioms - Normal spaces - The Urysohn's lemma. (Section 30,31,32,33 of chapter 4)

UNIT V

The Urysohn Metrization theorem - Tietze's Extension theorem - The Tychonoff theorem. (Section 34,35 of chapter 4 & section 37 of chapter 5)

TEXT BOOK :

Topology (Second Edition 2000) : James R. Munkres Pearson Education, New Delhi.
ISBN 81-7758-579-7

REFERENCE BOOK :

Introduction to Topology and Modern Analysis : G.F. Simmons McGraw Hill
books Company, New Delhi.

GRAPH THEORY

Semester : II

Subject Code:

Contact hours per week:6

Credit : 4

Objectives:

To enable the students to

- ◆ understand the fundamental concepts and theorems in Graph theory
- ◆ Develop their knowledge in the current areas of Graph theory and to create research culture among the students in subject.
- ◆ increase their ability to perform well in UGC / CSIR examinations

UNIT I

What is graph?-Applications of graphs-finite and infinite graphs-incidence and degree-isolated vertex-pendent vertex and null graphs-brief history of graph-isomorphism subgraphs-walks, paths and circuits-connected graphs, disconnected graphs and components.More on Euler graphs-Hamitonian path and circuit.

UNIT II

Trees and Fundamental Circuits: Trees – Some properties of Trees – Pendant Vertices in a Tree – Distance and Centres in a tree – Rooted and Binary Trees –m On Counting Trees – Spanning Trees –Fundamental Circuits – Finding all spanning Trees of a Graph – Spanning Trees in a Weighted Graph(Chapter 3 of Narsingh Deo)

UNIT III

Direted Graphs: What is a Directed graphs? – Some types of Digraphs – Digraphs and Binary Relations – Directed Path and Connectedness – Euler Digraphs – Digraphs and Binary Relations – Directed Path and Connectedness – Euler Digraphs – Trees with Directed Edges – Fundamentals Circuits in Digraphs –Matrices A, B and C of Digraphs – Adjacency Matrix of a Digraph – Paired comparisons and Tournaments – Acyclic Digraph and Decyclization.(Chapter 9 of Narsingh Deo)

UNIT IV

Enumeration of Graphs: Types of Enumeration – Counting Labeled Trees – Counting Unlabeled Trees – Polya's Counting Theorem – Graph Enumeration with Poly's Theorem(Chapter 10 of Narsingh Deo)

UNIT V

Graph Theory in Operations research : Transport Network – Extensions of Max-Flow Min-Cut Theorem – Minimal Cost Flows – The Multi Commodity Flow(Chapter 14 – section (1-4) of Narsingh Deo)

TEXT BOOK :

Graph theory : Narsingh Deo, Prentice Hall of India, New Delhi.

Application of Graph Theory: Dr.M.Murugan, Muthali Publications, Chennai.

REFERENCE BOOKS:

- 1.Graph Theory: John Clark & Derek Allan Holton , Allied Publishers Ltd ISBN 81-7023-463-8. First Indian reprint 1995.
- 2.Introduction to Graph theory : Douglas B- west 2nd edition,
Prentice Hall of India, New Delhi.
- 3.Graph Theory : Narshing Deo, Prentice Hall of India, New Delhi.

OPERATION RESEARCH

Semester II

Subject Code:

Contact hours per week : 6

Credit : 5

Objectives :

To enable the students to

- ◆ understand and apply some of the widely used techniques of Operations Research
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Network Models :

Network definitions – Minimal spanning tree algorithm – Shortest – Route problem – Maximal flow model (Section 6.1 ,6.2,6.3 – 6.3.1,6.3.2, 6.4 -6.4.1,6.4.2 of chapter 6)

UNIT II

CPM and PERT :

Network Representation – Critical path (CPM) computations - Construction of the time schedule (Section 6.6 – 6.6.1,6.6.2,6.6.3 of chapter 6)

UNIT III

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-steady –State measures of performance - Single-server models - Multiple - server models - (M/M/C):(GD/ ∞ / ∞)- M/M/C): (GD/N/ ∞), $c \leq n$. (Section 17.1,17.2,17.3,17.4-17.4.1,17.,17.5,17.6 – 17.6.1 to 17.6.3 of chapter 17)

UNIT IV

Classical Optimization Theory :

Unconstrained problems – Constrained problems.

(Section 20.1,20.2 of chapter 20)

UNIT V

Nonlinear Programming Algorithms :

Unconstrained algorithms – Direct search method – Gradient method –
Constrained algorithms - Separable programming – Quadratic programming – Geometric programming. (Section 21.1,21.2 – 21.2.1 to 21.2.3 of chapter 21)

TEXT BOOK:

Operation Research : H.A.Taha,VII edition - Prentice- Hall of India Private Ltd,
New Delhi. ISBN 81-7808-757-X

REFERENCE BOOK:

Introduction to Operation Research : F.S.Hillier and G.J.Liebermann (1995)
McGraw Hill

Combinatorial Mathematics

Semester: II

Subject Code:

Contact hours per week:6

Credit :5

Unit I

Introduction, the rules of sum and product, Permutations, Distribution of distinct Objects, distributions of Non- distinct objects, Generating functions and combinations Enumerators for permutations

(Chapter 1, Sections 1.1 to 1.6 and Chapter 2, Sections 2.1 to 2.3)

Unit II

Distributions of distinct objects into non - distinct cells, Partitions of integers, Elementary relations, Linear recurrence relations with constant coefficients, Solution by the technique of generating functions

(Chapter 2, Sections 2.4, 2.5, 2.7 and Chapter 3, Sections 3.1, 3.2,3.3)

Unit III

Recurrence relations with two indices, The principle of inclusion and exclusion, The general formula Derangements, Permutations with restrictions on relative positions (Chapter 3, Sections 3.5, Chapter 4, Sections 4.1 to 4.5)

Unit IV

Introduction Equivalence classes under permutation group, Equivalence classes of functions, Weights and inventories of functions, Polya's fundamental theorem, Generalization of Polya's theorem

(Chapter 5, Sections 5.1 to 5.7except 5.2)

Unit V

Introduction, The connectedness of a graph, Euler path, Hamiltonian path (Chapter 6, Sections 6.1 to 6.4)

Text Book:

Introduction to Combinatorial Mathematics by C.T.Liu, McGraw Hill, 1968

Chapter 1: Sections 1.1 to 1.6, Chapter 2: Sections except section 2.6.

Chapter 3: Sections except section 3.4, Chapter 4: Sections except sections 4.6 and 4.7

Chapter 5: Sections except section 5.2, Chapter 6: Sections 6.1 to 6.5

Visual Basic with Practicals

Semester: II

Subject Code:

Contact hours per week:6

Credit :5

Unit I

Introduction, First application, Programming environment.

Unit II

Intrinsic Controls, Projects in VB6, working with properties, methods, events.

Unit III

Data types, Constants, Variables, making statements in programs.

Unit IV

Conditional statements, loops, Arrays, Strings, type casting.

Unit V

Creating menus, Dialog boxes and enhancement of programs, key board, mouse input programs, Graphics.

Text Book:

Practical Visual Basic 6, by Bop Roselman and Richard Peasley, (QUE Publications)-
Prentice Hall of India, 2000 (cheap edition)

Unit I – Chapter 1: Sections 1,2,3, Unit II - Chapter 1: Sections 4,5,6

Unit III – Chapter 2: Sections 7,8, Unit IV - Chapter 9,10,11,12

Unit V – Chapter 3: Sections 13,14,15,17.

ALGEBRA III

Subject Code :

Semester : III

Hours per week:6

Credits : 5

Objectives :

To enable the students to

- ◆ understand the concepts in Field Theory, Extension Fields, Finite Fields and Galois theory
- ◆ increase their ability to perform well in UGC / CSIR and other competitive examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Field theory – Extension field – Algebraic extension – Transcendence of e .
(Sections 5.1, 5.2 of Chapter 5 in I. N. Herstein)

UNIT II

Roots of polynomial – Splitting field – Irreducible polynomial – Construction with straightedge and compass. (Sections 5.3 & 5.4 of Chapter 5 in I. N. Herstein)

UNIT III

More about roots – Multiple roots – Characteristic of a field – Simple extensions – The elements of Galois theory – Group of automorphisms of a field – Normal extension. (Section 5.5 & 5.6 of Chapter 5 in I. N. Herstein)

UNIT IV

Solvability by Radicals - Galois groups over the Rationals
(Section 5.7 & 5.8 of Chapter 5 in I. N. Herstein)

UNIT V

Finite field – splitting field of a polynomial – Wedderburn's theorem on finite division rings – Jacobson's theorem.
(Sections 7.1 & 7.2 of Chapter 7 in I. N. Herstein)

TEXT BOOK:

Topics in algebra, I. N. Herstein, University of Chicago, John Wiley & Sons

REFERENCE BOOK:

A first course Abstract Algebra, John B. Fraleigh, Addition –
Wesley Publishing company

STATISTICS

Subject Code :

Semester : III

Hours per week: 6

Credits : 4

Objectives:

To enable the students to

- ◆ understand the basic concepts of probability and to know the various discrete and continuous distributions and to apply the various sampling tests to the practical situations
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Probability and Distributions – Set Theory – The Probability Set Function – Conditional Probability and Independence – Random Variable of the Discrete type – Random Variables of the Continuous Type – Properties of the Distribution Function – Expectation of a Random Variable – Some Special Expectations – Chebyshev's Inequality.

UNIT II

Multivariate Distributions – Distribution of Two random variables – Conditional Distributions and Expectations – The Correlation Coefficient – Independent Random Variables – Extension to Several Random Variables.

UNIT III

Some Special Distributions – The Binomial and Related Distributions – The Poisson Distributions – The Gamma and Chi-square Distributions – The Normal Distribution – The Bivariate Normal Distribution.

UNIT IV

Distributions of Functions of Random Variables - Sampling Theory – Transformations of Variables of the Discrete Type – Transformations of Variables of the Continuous Type – The Beta, t and F Distributions – Extensions of the Change of Variables Technique – Distributions of Order Statistics – The Moment Generating - Function Technique – The Distributions of \bar{X} and ns^2/σ^2 -Expectations of Function of Random Variables-The Multivariate Normal Distribution.

UNIT V

Limiting Distributions - Convergence in Distribution - Convergence in Probability - Limiting Moment Generating Functions - The Central Limit Theorem Some Theorems on Limiting Distributions.

TEXT BOOK:

Introduction to Mathematical Statistics

Robert V.Hogg Allen T.Craig
Publishing Macmillan

REFERENCE BOOK:

Fundamendals of Mathematical Statitics

S.C.Gupta & V.K.Kapur
Publishing S.Chand

COMPLEX ANALYSIS

Subject Code :

Semester : III

Hours per week: 6

Credits : 5

Objectives:

To enable the students to

- ◆ understand the concepts and results in Complex Analysis
- ◆ understand the theory of calculus in Complex Analysis
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Complex numbers – The algebra of complex numbers – The geometric representation of complex numbers – Complex functions – Introduction to the concept of analytic function – Elementary theory of power series – Exponential and Trigonometric functions.(chapter 1 & 2 fully)

UNIT II

Analytic function as mappings – Elementary set topology – Analytic functions in regions – Necessary and Sufficient condition for a function to be conformal – Linear transformation – Elementary conformal mapping – $w = z^\alpha$, $w = e^z$, $z_1 = (z + 1) / (z - 1)$.(chapter 3-section1,2,3-3.1 to 3.3, chapter 4- 4,4.1- page no-49-82, 89-93)

UNIT III

Complex integration – Fundamental theorems – Cauchy's integral formula – Local properties of analytical function – The general form Cauchy's theorem.(chapter 4-section -1,2,3,4-4.1 to 4.4, page no-101-142)

UNIT IV

The Calculus of residues-The Residue theorem-The argument principle-Evaluation of definite integrals (chapter 5-section-5.1,5.2,5.3, page no-148-161)

UNIT V

Power series expansions - Weierstrass's theorem -The Taylor series - The laurent series - Simple problems.(chapter 5-section-1.1 to 1.3)

TEXT BOOK :

Complex Analysis : Lars V.Ahlfors Chapter 1,Chapter 2,
Chapter 3.1,3.2.3,3.3,3.4.2,Chapter 4, Chapter 5-1.1, 5.1.2, 5.1.3
McGraw Hill Publications

REFERENCE BOOK :

Complex Analysis : V.Karunakaran - Narasa Publisher , Chennai.
Complex Analysis : Shanti Narayanan - Chand and Cp,New Delhi.

Fuzzy Mathematics

Subject Code :

Semester : III

Hours per week: 6

credits : 4

Objectives:

To enable the students to

- ◆ become familiar with the various concepts of Fuzzy sets and Fuzzy Algebra
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I

Fuzzy sets – basic types – Fuzzy sets – basic concepts – Additional properties of α - Cuts – Representation of fuzzy sets – extension principle for fuzzy sets – Types of Operations - Fuzzy complements.

Unit II

Fuzzy numbers – Linguistic variables – Arithmetic operations on intervals – Arithmetic operation on fuzzy numbers.

Unit III

Fuzzy relation – Crisp versus fuzzy relations – projections and cylindric extensions-Binary fuzzy relations on a single set – Fuzzy equivalence relations – Fuzzy compatibility Relations – Fuzzy ordering relations.

Unit IV

Fuzzy logic – Classical logic – An over view – multivalued logic – Fuzzy Propositions – Fuzzy quantifiers – Linguistic Hedges – Inference from conditional fuzzy Propositions – Inference from conditional and quantified propositions – Inference from Quantified propositions.

Unit V

Applications – Applications to Civil Engineering – Computer Engineering – Reliability Theory – Robotics – Medicine – Economics _ Fuzzy Regressions – Interpersonal Communications.

Text Book:

Fuzzy sets and Fuzzy logic – Theory and applications – Second Edition ,

By George J.Klir and B.Yuan . Publisher – Prentice Hall – 1995

Chapter 1 : (1.2 , 1.3 , 1.4) , Chapter 2 : (2.1 , 2.2 , 2.3) , chapter 3 : (3.1 , 3.2)

Chapter 4 : (4.1 , 4.2 , 4.3 , 4.4 , 4.6) , Chapter 5 : (5.1 to 5.6)

Chapter 16 : (16.2 , 16.5 , 16.6 , 16.7) , Chapter 17 : (17.2 , 17.3 , 17.5 , 17.6)

Reference Book :

Fuzzy Set Theory and its Application – Forth Edition , by A.J Zimmermann. Spriger

– International Edition. Chapter 4 , Chapter 5 , Chapter 8 : (8.1 to 8.8) Chapter 16 ,

Chapter 17.

NUMERICAL ANALYSIS

Semester : III

Subject Code

:

Hours per week: 6

credits : 5

Objectives :

To enable the students to

- ◆ understand the basic concepts of polynomial equations and to know Eigen value problem and interpolation method and to study the Differentiation, Integration and Numerical Methods
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Transcendental and Polynomial equations – Introduction – Bisection method – Iteration methods based on first degree equations – Rate of convergence (only for Secant method, Regula- falsi method and Newton Raphson method)(Chapter 2 –Section – 2.1 to 2.3,2.5).

UNIT II

System of Linear Algebraic Equation and Eigen value Problems-Introduction – Direct Methods – Error Analysis - Iteration Methods - Eigen values and Eigen vectors .
(Chapter 3 - section – 3.1 to 3.5)

UNIT III

Interpolation and Approximation: Introduction – Lagrange and Newton Interpolations - Finite Difference Operators - Interpolating polynomials Using Finite Differences – Hermite Interpolations-Piecewise and Spline Interpolation.
(Chapter 4 - section – 4.1 to 4.6)

UNIT IV

Differentiation and Integration: Introduction - Numerical Differentiation - Extrapolation Methods - Methods based on Interpolation - Composite Integration Methods - Romberg Integration - Double Integration.
(Chapter 5 - section – 5.1 , 5.2 , 5.4 to 5.7 , 5.9 , 5.10)

UNIT V

Ordinary Differential Equations: Introduction – Numerical Methods – Single step Methods. (Chapter 6 - section – 6.3 , 6.4 pg.no 434 to 459)

TEXT BOOK:

Numerical Methods

M.K.Jain, S.R.K.Iyengar, R.K.Jain

K.K.Gupta - New age international pvt ltd.

REFERENCE BOOKS:

Introductory methods of numerical analysis (Third Edition) Sastry Prentice-hall of India Private limited New Delhi. Elementary Numerical Analysis, Conte De Boor, Mc Graw Hill Kogakusha ltd., International student Edition, 1986.

Bio Statistics

Subject Code :

Semester : III

Hours per week: 6

Credits : 5

To enable the students to

- ◆ understand the basic concepts of probability and to know the various discrete and continuous distributions and to apply the various sampling tests to the practical situations
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I

Collection of data – primary & secondary data – Classification and Tabulation – Diagrammatic Representation , measures of central tendency ; mean , median , mode – geometric mean , harmonic mean – C Class history rows

Unit II

Measures of dispersion – Range , quartile deviation of combined set , Coefficient of variation , Correlation , regression lines and rank correlation.

Unit III

Probability – Addition theorem & Multiplication theorem – Binomial distribution – Poisson distribution – Normal distribution – Simple problems.

Unit IV

Chi – Square Test – Degrees of freedom – Test of Goodness of fit – Test of independence

Unit V

Applications – Health Surveys – Sample Size determinations – Methods of mortality data analysis - path coefficient analysis in medicine – Statistical Modeling in health and disease.

Text Books:

1. Statistics by R.S.N Pillai & V.Bagavathi S.Chand Company Ltd – 1994
2. Bio Statistics Editd by B.L Verma, G.D Shukla & R.N Srivastava ., C.B.S Publishers & Distributors. 485, Bhola Nath Nagar , Delhi.

From Text Book 1:

Relevant portions for units 1 ,2,3 and 4 only

From Text Book 2:

Chapters 1,2,3,4,5,10 for unit 5 only

Business Statistics

Subject Code :

Semester : III

Hours per week: 6

Credits : 5

To enable the students to

- ◆ understand the basic concepts of probability and to know the various discrete and continuous distributions and to apply the various sampling tests to the practical situations
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I

Measures of central tendency – Definition – Mean – median – Mode – their merits and demerits – Weighted Arithmetic mean.

Unit II

Measures of dispersion and skewness – Range – Quartile deviation – standard deviation – Coefficient of variation – Pearsons and Bowley Coefficient of skewness.

Unit III

Scatter diagram – Pearson's Coefficient of correlation – Rank correlation.

Unit IV

Index numbers – Meaning and uses – Method of construction – Laspeyer's method – Paasche Method – Fisher's Ideal Index – Marshall Edgeworth method – Kelley's method.

Unit V

Analysis of time series – Estimation of trend – Methods of least squares (Straight line only) – Free hand curve.

Text Book:

Elements Statistical Methods, by S.P.Gupta, Publishers: Sultan Chand & Sons,
16th Edition(2005), (Relevant portion)

FUNCTIONAL ANALYSIS

Subject Code :

Semester : III

Hours per week: 6

credits : 5

Objectives:

To enable the students to

- ◆ become familiar with the various concepts and theorems in Hilbert Spaces
- ◆ understand the concepts of Spectral Analysis of self-Adjoint operators, Spectral theorem and its significance
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I

Chapter VI - (Unit 21.1 to 21.5 of **B.V.Limaye**) Inner product spaces
(Review only - not for examination) Chapter VI - (Unit 21.6, 21.7, 21.8, 22, 24 of **B.V.Limaye**, omitting the sections with bullet marks) Inner product spaces – Orthonormal sets - Projection and Riesz Representation Theorems.

UNIT II

Chapter VII - (Unit 25, 26) of **B.V.Limaye**, omitting the sections with bullet marks)- Bounded Operators on Hilbert Spaces - Bounded Operators and Adjoints - Normal, Unitary and Self Adjoint Operators.

UNIT III

Chapter VII – (Units 27, 28) of **B.V.Limaye**, omitting the sections with bullet marks) - Spectrum and Numerical Range .

UNIT IV

Chapter VIII - (Units 29, 30 of **B.V.Limaye**, omitting the sections with bullet marks) Spectral Analysis of self Adjont operators -Orthogonal Projections – Resolutions of Identity.

UNIT V

Chapter VIII - (Units 31, 32 of **B.V.Limaye**, omitting the sections with bullet marks) Spectral Theorem – Significance of Spectral Theorem.

TEXT BOOK : Functional Analysis (First Edition 1981)

B.V.Limaye, Wiley Eastern Limited.

REFERENCE BOOK : Introduction to Topology and Modern Analysis

G.F. Simmons, McGraw Hill Company

Number Theory

Subject Code :

Semester : IV

Hours per Week : 6

Credits :4

Objectives:

To enable the students to

- To make the students understand the basic concepts to become familiar with the techniques to have some variety and depth in Number theory.
- To introduce the basic concepts of arithmetical functions and average of arithmetical functions.
- To have an extensive study of the properties of arithmetical functions.
- To appreciate the results on congruence, quadratic residues and to solve problems.

Unit I

The fundamental Theorem of Arithmetic , Arithmetical functions and Dirichlet multiplication. (chapter 1-section 1.1 to 1.8, chapter 2- section 2.1 to 2.11)

Unit II

Averages of Arithmetical functions. (chapter 3-section 3.1 to 3.11)

Unit III

Some elementary theorems on the distribution of prime numbers.
(chapter 4-section 4.1 to 4.9)

Unit IV

Congruencies. (chapter 5-section 5.1 to 5.10)

Unit V

Quadratic residues and the quadratic reciprocity law. (chapter 9-section 9.1 to 9.11)

Text Book

Torm M.Apostol , Introduction to Analytic Number theory , (chapter 1 – 5 , Narosa Publishing House , New Delhi , 1998

Reference Books:

- 1.David M.Burton , Elementry Number Theory , Universal Book Stall , New Delhi
- 2.Z.I.Borerich , I.R.Shafarerich , Number Theory , Academic press , Inc
- 3.Kumaravelu , Susheela Kumaravelu , Elements of Number theory , Raja sarka offset Printers , Siakasi , 2002.

CALCULUS OF VARIATIONS AND LINEAR INTEGRAL EQUATIONS

Subject Code :

Semester : IV

Hours per Week : 6

Credits :4

Objectives:

To enable the students to

- ◆ Understand the concepts of Calculus of Variation and Linear Integral Equations.
- ◆ Solving problems in these areas
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

UNIT I(Integral Equation)

Introduction – Types of Kernels – Eigen values and Eigen Function – Differentiation under the sign of Integration(Leibnitz's Rule) – Connection with Differential Equations- Solution of an Integral Equation – Conversion of Differential Equations to Integral Equations: Initial Value Problem – Boundary Value Problem. (chapter 1 of integral equation and boundary value problems)

Unit II

Solution of Homogeneous Fredholm Integral Equation of the second kind with separable (or Degenerate) kernel – Orthogonality and Reality of Eigen Functions – Fredholm Integral Equation with Separable kernel – introduction of solution of integral Equations of second kind- solution of Fredholm integral equation of the second kind by successive substitution – Solution of Volterra integral equation of the second kind by successive substitution- solution of Fredholm integral equation of the second kind by successive approximation. (chapter 2 full and chapter 4 – section 4.1 to 4.4 of integral equations and boundary value problems)

UNIT III

Volterra's solution of Fredholm integral equation of the second kind-solution of volterra integral Equation of second kind by successive Approximation: Neumann - series – Some particular cases – Reduction of Volterra integral equation into Differential Equation- Reduction of Volterra integral equation of first kind to a volterra integral equation of second kind. (chapter 4-section 4.6 to 4.10 of integral equations and boundary value problems)

UNIT IV

Calculus of Variations: Introduction – Functionals- Euler's equation – Another form of euler equation – Particular cases of Euler's equation-Necessary condition of Extremum- sufficient condition of extremum. (chapter 1 – section 1.1 to 1.7)

UNIT V

Sufficient conditions for Extremums – Functionals dependent on higher Order derivatives – Extension of the variational case: (Several dependent variables) – Isoperimetric problems – Lagrange's equation- Invariance of Euler's equation. (chapter 1 –section 1.8 to 1.12)

TEXT BOOKS

1. Integral Equations and Boundary Value Problems by Dr.S.K.Pundir & Dr.Rimple Pundir , Pragathi prakashan publications,second revised edition 2007.
2. Calculus of Variations by Dr.S.K.Pundir , Pragathi Prakshan publications, fourth edition 2012.

Stochastic Processes

Subject Code :

Semester : IV

Hours per Week : 6

Credits :5

Objectives

To enable the students to

- Understand the concepts stochastic processes , Markov chains and Poisson processes
- Solve problem in these areas
- Develop self study habits
- Develop the right approach towards research.

Unit I

Introduction – Specification of stochastic processes – Stationary Processes – Martingales - Definition and Examples – Higher Transition Probabilities
(Chapter 2 – Section – 2.1 to 2.4 , Chapter 3 – Section – 3.1 , 3.2)

Unit II

Generalisation of Independent Bernoulli Trials : Sequence of Chain Dependent Trials – Classification of States and Chains – Determination of Higher Transition Probabilities. (Chapter 3 – Section – 3.3 to 3.5)

Unit III

Poisson Process – Poisson Process and Related Distributions – Generalisations of Process – Birth and Death Process
(Chapter 4 – Section – 4.1 to 4.4)

Unit IV

Renewal Process – Renewal Processes in Continuous Time – Renewal Equation – Stopping Time : Wald's Equation – Renewal Theorems
(Chapter 6 – Section – 6.1 to 6.5)

Unit V

Introduction – Models of Time series – Time and Frequency Domain : Power Spectrum – Statistical Analysis of Time Series
(Chapter 8 – Section – 8.1 to 8.4)

Text Book :

Medhi . J , 1987 , Stochastic Processes , Wiley Eastern limited , New Delhi.

Reference Book:

1. Karlin. S and Taylor.H.M(1975), A First Course on stochastic processes, Newyork: Academic Press.
2. Ross S.M(1996), Stochastic Processes Second Edition Newyork Wiley.

Econometrics

Subject Code :

Semester : IV

Hours per week: 6

Credits : 5

To enable the students to

- ◆ understand the basic concepts of sampling and to know the regression and analysis of variance to apply the various sampling tests to the practical situations
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I : Basic concepts

Nature meaning and Scope of Economics – Goals and Division of Econometrics
– Methodology of Econometrics Research – Properties of an Econometric model.

Unit II : The Simple Linear Regression model

Assumptions, Estimation (OLS Method) – Properties of Estimators – Gauss
Markov Theorem – Concepts and Derivation of R^2 and Adjusted R^2 – Statistical Tests of
Significance – Regression and Analysis of Variance – Approach and application.

Unit III : Regression with Qualitative Variables

Dummy variable technique – Interaction effects – Seasonal Analysis , Piece wise
Linear Regression – Regression with dummy dependent variables – The LPM logic, Probit
and Tobit Models – Applications

Unit IV : Econometrics problems

Nature , detection , consequences and remedial steps of problems of
Heteroscedasticity, Multi-Collinearity and Auto – Correlation – Specification – Problem
– Errors of Measurement

Unit V : Simultaneous Relationship

Models of simultaneous equation – the problem of identification – ILS and Two
Stage Least Squares

Books for Reference:

1. A. Koutsoyanni, "Theory of Econometrics", Macmillan.
2. Chow G.C., "Econometrics", McGraw Hill, New York.
3. Intriligator M.D., "Econometrics, methods, Techniques and Applications",
Prentice Hall.
4. Theil H., "Introduction to Econometrics", Prentice hall.
5. Goldberger A.S., "Introductory Econometrics", Harvard University Press.

Application of Statistics

Subject Code :

Semester : IV

Hours per Week : 6

Credits :5

To enable the students to

- ◆ understand the basic concepts of probability and to know the various discrete and continuous distributions and to apply the various sampling tests to the practical situations
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I

Point Estimation – Confidence intervals for means – Confidence intervals for differences of Means – tests of statistics Hypotheses – additional comments about statistical tests – chi-squared Tests

Unit II

Measures of quality of estimators – a sufficient statistic for a parameter - properties of a sufficient statistic – Completeness and uniqueness – the exponential class of probability density Functions – Functions of a parameter – The case of several parameters – minimal sufficient and ancillary statistics.

Unit III

Bayesian estimation – Fisher information and the Rao-Cramer inequality – Limiting Distribution of maximum likelihood estimators

Unit IV

Certain best tests – Uniformly most powerful tests – Likelihood ratio tests – The sequential Probability ratio test

Unit V

Distribution of certain quadratic forms – A test of the equality of several means – Noncentral χ^2 and noncentral F – multiple comparisons – the analysis of variance – a regression problem – A test of independence

Text Book

Introduction to Mathematics statistics , V Edition , by r.V.Hogg and A.T.Craig , Pearson Education , Asia , 2002

Chapter 6 – Section 6.1 to 6.6 , Chapter 7 – Section 7.1 to 7.8

Chapter 8 – Section 8.1 to 8.3 , Chapter 9 – Section 9.1 to 9.4

Chapter 10 – Section 10.1 to 10.7

Real Analysis I

Subject Code :

Semester : I

Hours per Week : 6

Credits :5

Objectives :

To enable the students to

- ◆ understand the basic concepts and to make the students familiar with importance of mathematical analysis such as convergence, continuity and differentiation
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I

The real and Complex Number Systems: Introduction-Ordered Sets – Fields - The Real Field – The Extended Real Number System – The Complex Field – Euclidean Spaces – Finite, Countable , and Uncountable Sets – Metric Spaces.

Unit II

Basic Topology: Compact Sets – Perfect Sets – Connected Sets.

Unit III

Numerical Sequences and Series: Convergent Sequences – Subsequences – Cauchy Sequences – Upper and Lower Limits – Some Special Sequences – Series.

Unit IV

Numerical Sequences and 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.

Unit V

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

Text Book:

Principles of Mathematical Analysis: Walter Rudin, Third Edition. Chapter 1,2,3,4.

REFERENCE BOOKS :

Methods of Real Analysis (1975) : R.R.Goldberg - Oxford and IBH Publishing House.

Mathematical Analysis (1977) : T.M.Apostol - Addison Wesley Publishing House.

Real Analysis II

Subject Code :

Semester : II

Hours per Week : 6

Credits :5

Objectives :

To enable the students to

- ◆ understand the basic concepts and to make the students familiar with importance of mathematical analysis such as convergence, continuity and differentiation
- ◆ increase their ability to perform well in UGC / CSIR examinations
- ◆ create interest in going for research after their post graduation

Unit I

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.

Unit II

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 III

Discussion of Main Problem – Uniform Convergence – Uniform Convergence and Continuity.

Unit IV

Uniform Convergence and Integration – Uniform Convergence and Differentiation – Equicontinuous Families of Functions – The Stone –Weierstrass Theorem.

Unit V

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.

Text Book:

Principles of Mathematical Analysis: Walter Rudin, Third Edition.
Chapter 5,6,7,8.

REFERENCE BOOKS :

Methods of Real Analysis (1975) : R.R.Goldberg - Oxford and IBH Publishing House.
Mathematical Analysis (1977) : T.M.Apostol - Addison Wesley Publishing House.

DEPARTMENT MATHEMATICS

Yadava College , Madurai – 14

B.Sc (Mathematics) – 2010 - 2011

Semester	Title of the Subject	Status
I	Classical Algebra	No change
	Calculus	No change
II	Analytical Geometry 3D & Vector Calculus	No change
	Differential Equations	No change
III	Modern Algebra	No change
	Programming in C (or) M.S.Office	No change
	Mathematics for Competitive Exam I	No change
	Ancillary Mathematics I	Changes are made
IV	Real Analysis	No change
	Programming in C++ (or) RDBMS	No change
	Mathematics for Competitive Exam II	No change
	Ancillary Mathematics II	Changes are made
V	Operation Research	No change
	Complex Analysis	No change
	Statistics I	No change
	Mechanics	Changes are made
	Java (or) Oracle	No change
	Ancillary Mathematics III	No change
VI	Linear Algebra	No change
	Automata Theory	No change
	Graph Theory	No change
	Statistics II	No change
	Numerical Analysis	No change
	Ancillary Mathematics IV	No change

DEPARTMENT MATHEMATICS

Yadava College , Madurai – 14

B.Sc., Mathematics(R & S/F) – 2015 - 2016

Semester	Title of the Subject	Status
I	Analytical Geometry 3D & Vector Calculus	Change
	Calculus & Trigonometry	No change
II	Classical Algebra	Change
	Differential Equations	No change
III	Modern Algebra	No change
	Programming in C (or) M.S.Office	No change
	Mathematics for Competitive Exam I	No change
	Ancillary Mathematics I	No change
IV	Real Analysis	No change
	Programming in C++ (or) RDBMS	No change
	Mathematics for Competitive Exam II	No change
	Ancillary Mathematics II	No change
V	Operation Research	No change
	Complex Analysis	No change
	Statistics I	No change
	Mechanics	No change
	Java (or) Oracle	No change
	Ancillary Mathematics III	No change
VI	Linear Algebra	No change
	Automata Theory	No change
	Graph Theory	No change
	Statistics II	No change
	Numerical Analysis	No change
	Ancillary Mathematics IV	No change

