

HAJEE KARUTHA ROWTHER HOWDIA COLLEGE

(An Autonomous Institution Affiliated to Madurai Kamaraj University, Madurai.)
(Re-Accredited at “A” Grade, by NAAC,Banglore)

UTHAMAPALAYAM – 625533.



DEPARTMENT OF MATHEMATICS BACHELOR OF SCIENCE - MATHEMATICS SYLLABUS (Effect from the Academic Year 2017 – 2018 Onwards)

PROGRAM SPECIFIC OUTCOMES

- PSO1.** Understand the basic concepts of Calculus, Trigonometry, 3d Geometry, Vector calculus, Analysis, Algebra, and Statistics
- PSO2.** Create, corroborate, and evaluate hypotheses, theories, and methods with adequate proof
- PSO3.** Solve complex problems by critical thinking and explicate a solution in real life situations
- PSO4.** Acquire, analyze, synthesize and interpret data to write reports by applying basic mathematical rules
- PSO5.** Apply mathematical skills in the field of computer to create relevant database records encapsulating multiple variables

HAJEE KARUTHA ROWTHER HOWDIA COLLEGE

(AUTONOMOUS)

UTHAMAPALAYAM

DEPARTMENT OF MATHEMATICS

Choice Based Credit System

B.Sc., Mathematics (Semester)

Programme Scheme, Scheme of Examinations & Syllabus

(Effect from the academic year 2017– 2018 onwards)

ELIGIBILITY:

Passed in H.Sc., or any other Examination accepted by the Syndicate as Equivalent.

DURATION OF THE COURSE:

The students who are joining the degree shall undergo a study period of three academic years- Six Semesters.

ELIGIBILITY FOR THE DEGREE:

A candidate shall be declared as passed the program if he/she scored a minimum of 40% of total marks (internal and External) in each course. A minimum required mark in external is 27.

SUBJECTS OF STUDY:

Medium of instruction : English

Part – I - Tamil

Part – II - English

Part – III - i) Core Subjects

ii) Allied Subjects

iii) Elective Subjects

Part – IV i) Non- major Subjects

ii) Skill based Subjects

ii) Environmental Studies

iv) Value Education

Part – V Extension Activities

EVALUATION:

Theory: Internal – 25 marks

External – 75 marks

Total – 100 marks

Pattern of Continuous Internal Assessment Examinations (CIAE)

Average of Two Internal Tests (each 20 marks) - 20 Marks

Assignments - 05 Marks

Total - 25 Marks

External 75 marks will be as follows:

Section A – 10 x 1 = 10 (Objective type – Multiple choice.

Two questions from each Unit)

Section B – 5 x 7 = 35 (Either A (or) B ,from all five units.)

Section C – 3 x 10 = 30 (Three out of five questions – one from each unit)

External Examination: 75 Marks - Time: 3 hours.

The pattern of External Examination Question Paper for **Part I, Part III and IV** will be as follows :

Section – A (10 X 1 = 10 Marks)

Question numbers 1 to 10 - Answer all questions. (multiple choice)

Two questions from each unit.

Four choices in each question.

Section – B (5 X 7 = 35 Marks)

Question numbers 11to 15.

Answer all questions choosing either A or B.

One question from each unit.

11 A or 11 B

12 A or 12 B

13 A or 13 B

14 A or 14 B

15 A or 15 B

Section – C (3 X 10 = 30 Marks)

Question numbers 16 to 20.

Answer any three out of five.

One question from each unit.

The pattern of External Examination Question Paper for **Part II** will be as follows :

Section – A: Prose 16 Marks

Section – B: Poetry 11 Marks

Section – C: Short Story 13 Marks

Section – D: Grammar 19 Marks

Section – E: Composition 16 Marks

The pattern of External Examination Question Paper for **Part IV Environmental Studies and Value Education** will be as follows :

Section – A: (5 X 6 = 30 Marks)

Question numbers 1 to 5 – Answer all questions choosing either (a) or (b).

One question from each unit.

Descriptive Type – 100 words each.

Section – B (3 X 15 = 45 Marks)

Question numbers 6 to 10.

Answer any three out of five.

One question from each unit.

Descriptive and Analytical Type – 250 words each.

HAJEE KARUTHA ROWTHER HOWDIA COLLEGE (AUTONOMOUS)

B.Sc., MATHEMATICS- COURSE CONTENT (2017-2018 BATCH)

SEM	PART	COURSE CATEGORY	COURSE CODE	COURSE TITLE	CREDITS	HOURS	Int. Marks	Ext. marks	Total Marks
I	I	LANGUAGE	17UTAL11 17UARL11 17UMLL11	TAMIL-I / ARABIC-I/ MALAYALAM-I	3	6	25	75	100
	II	LANGUAGE	17UENL11	ENGLISH FOR ENRICHMENT- I	3	6	25	75	100
	III	CORE-1 CORE-2	17UMAC11	CALCULUS	4	5	25	75	100
			17UMAC12	SEQUENCES AND SERIES	3	3	25	75	100
	III	ALLIED-1	17UPHA11	PHYSICS – I	4	6	25	75	100
	IV	SBS-1	17UMAS11	ARITHMETIC ABILITY	2	2	25	75	100
	IV	NME-1	17UMAN11	FUNDAMENTALS OF MATHEMATICS - I	2	2	25	75	100
TOTAL					21	30	175	525	700
II	I	LANGUAGE	17UTAL21 17UARL21 17UMLL21	TAMIL-II / ARABIC-II/ MALAYALAM-II	3	6	25	75	100
	II	LANGUAGE	17UENL21	ENGLISH FORENRICHMENT- II	3	6	25	75	100
	III	CORE-3 CORE-4	17UMAC21	TRIGNOMETRY AND FOURIER SERIES	4	5	25	75	100
			17UMAC22	THEORY OF EQUATIONS	3	3	25	75	100
	III	ALLIED-2	17UPHA21	PHYSICS – II	4	4	25	75	100
		ALLIED-3	17UPHA2P	PHYSICS-II (PRACTICAL)	1	2	40	60	100
	IV	SBS-2	17UMAS21	OFFICE AUTOMATION	2	2	25	75	100
	IV	NME-2	17UMAN21	FUNDAMENTALS OF MATHEMATICS - II	2	2	25	75	100
TOTAL					22	30	215	585	800
III	I	LANGUAGE	17UTAL31 17UARL31 17UMLL31	TAMIL –III/ ARABIC-III/ MALAYALAM-III	3	6	25	75	100
	II	LANGUAGE	17UENL31	ENGLISH FOR ENRICHMENT –III	3	6	25	75	100
	III	CORE-5	17UMAC31	ANALYTICAL GEOMETRY OF 3D & VECTOR CALCULUS	4	6	25	75	100
	III	ALLIED-4	17UPHA31	PHYSICS –III	4	6	25	75	100
	III	ALLIED-5	17UMAA31	PROGRAMMING IN C-THEORY(4hr) PROGRAMMING IN C-LAB (2hr)	4	6	25	75	100
TOTAL					18	30	125	375	500

SEM	PAR T	SUBJECT	CODE	TITLE OF THE PAPER	CREDITS	HOURS	Int. Marks	Ext. Marks	Total Marks
IV	I	LANGUAGE	17UTAC41 17UARL41 17UMLL41	TAMIL - IV/ ARABIC-IV/ MALAYALAM-IV	3	6	25	75	100
	II	LANGUAGE	17UENC41	ENGLISH FOR ENRICHMENT -IV	3	6	25	75	100
	III	CORE-6	17UMAC41	MECHANICS	5	6	25	75	100
	III	ALLIED-6	17UPHA41	PHYSICS IV	4	4	25	75	100
		ALLIED-7	17UPHA4P	PHYSICS-IV(PRACTICAL)	1	2	40	60	100
	III	ALLIED-8	17UMAA41	PROGRAMMING IN C++(THEORY)	4	4	25	75	100
		ALLIED-9	17UMAA4P	PROGRAMMING IN C& C++(LAB)	1	2	40	60	100
	V	EA	17UEAC41	EXTENSION ACTIVITIES	2	-	25	75	100
TOTAL					23	30	205	495	800
V	III	CORE-7	17UMAC51	REAL ANALYSIS	5	5	25	75	100
	III	CORE-8	17UMAC52	MODERN ALGEBRA	5	5	25	75	100
	III	CORE-9	17UMAC53	NUMERICAL ANALYSIS	5	5	25	75	100
	III	CORE-10	17UMAC54	DIFFERENTIAL EQUATIONS & LAPLACE TRANSFORMS	5	5	25	75	100
	III	ELECTIVE-1	17UMAE51	STATISTICS-I	4	6	25	75	100
		ELECTIVE-2	17UMAE52	DISCRETE MATHEMATICS					
	IV	SBS-3	17UMAS51	ASTRONOMY & ASTROPHYSICS	2	2	25	75	100
	IV	EVS	17UENS51	ENVIRONMENTAL STUDIES	2	2	25	75	100
TOTAL					28	30	175	525	700
VI	III	CORE-11	17UMAC61	COMPLEX ANALYSIS	5	5	25	75	100
	III	CORE-12	17UMAC62	LINEAR ALGEBRA	5	5	25	75	100
	III	CORE-13	17UMAC63	GRAPH THEORY	5	5	25	75	100
	III	CORE-14	17UMAC64	OPERATIONS RESEARCH	5	5	25	75	100
	III	ELECTIVE-3	17UMAE61	STATISTICS-II	4	6	25	75	100
		ELECTIVE-4	17UMAE62	NUMBER THEORY					
	IV	SBS-4	17UMAS61	MATHEMATICS FOR COMPETITIVE EXAMS	2	2	25	75	100
	IV	VE	17UENS61	VALUE EDUCATION	2	2	25	75	100
TOTAL					28	30	200	600	700

Semester	No. of Papers	Credits	Total mark
I	7	21	700
II	8	22	800
III	5	18	500
IV	7	21	700
V	7	28	700
VI	8	30	800
Grand Total	42	140	4200

CALCULUS

Programme :B.Sc.Maths
Semester : I
Course Code : 17UMAC11

Part: III – Core - I
Hours : 5
Credits: 4

COURSE OUTCOME:

CO1: Calculus is the mathematical study of change. It has two major branches, differential calculus(Concerning rates of change and slopes of curves) and integral calculus (Concerning accumulation of quantities and the areas under curves)

Unit-I

Successive Differentiation- Expansion of functions-Leibnitz formula- Maxima and Minima functions of two variables.

Unit-II

Polar co-ordinates-Angle between the radius vector and the tangent –Slope of tangent- Angle of intersection of two curves- Polar sub tangent and Polar sub normal.

Unit-III

Envelopes-curvatures-circle, radius, and centre of curvature-Evolutes.

Unit – IV

Polar co-ordinates-Radius of curvature in Polar co-ordinates -p.r. equation- pedal equation of curves- Definite integrals and their properties.

Unit-V

Reduction formula for $\sin^n X$, $\cos^n X$, $\tan^n X$, $\operatorname{cosec}^n X$, $\sin^n X \cos^m X$ - Bernoulli's formula- double and triple integrals-simple problems.

TEXT BOOK:

CALCULUS- Volume I and II by T.K. Manickavasagam Pillai and S.Narayanan.

Publications: S.Viswanathan, 1996.

SEQUENCE AND SERIES

Programme :B.Sc.Maths
Semester : I
Course Code : 17UMAC12

Part: III – Core - II
Hours : 3
Credits: 3

COURSE OUTCOMES:

CO1: Develop the mathematical analysis to understand sequence and series .

CO2: Progression as the mathematical expression that relates the position that occupies a term in the sequence with its value.

UNIT-I

Sequences- bounded, monotonic, convergent, divergent and oscillating sequences- subsequences- simple problems.

UNIT-II

Cauchy's Sequences- Cauchy' general principle of convergence.

UNIT-III

Infinite series- convergent, divergent series- Alternating series- simple problems.

UNIT-IV

Comparison test- simple problems.

UNIT-V

Tests of Convergence- Kummer's Test, D'Alembert's test, Raabe's Test, De Morgan and Betrand's test and Gauss's test (Statements only)- simple problems.

TEXT BOOK:

SEQUENCE AND SERIES by Dr.S.Arumugam and Mr.Thangapandi Issac(1997)
New Gamma publication

ANCILLARY PHYSICS
MECHANICS, PROPERTIES OF MATTER AND SOUND

Programme B.Sc.Maths
Semester : I
Course Code : 17UPHA11

Part: III – ALLIED- I
Hours : 6
Credits: 4

Unit-I

Newton's law of motion and their related terms – Types of forces in nature – Conservative and Non conservative forces - Inertial, Non-inertial frames - work done by a constant and varying force – Expression for kinetic energy – Expression for potential energy – Different forms of energy - Power - Friction- Angle of friction – Motion of bodies along an inclined plane

Unit-II

Angular velocity – Normal acceleration(no derivation) – Centrifugal and centripetal forces – Torque and angular acceleration – Work and power in rotational motion – Angular momentum – K.E of rotation – Moment of inertia – Laws of parallel and perpendicular axes theorems – M.I of ring, circular discs, solid cylinder and solid sphere.

Unit-III

Kepler's laws of planetary motion – Law of gravitation – Boy's method for G- Compound pendulum – expression for period – Experiment to find g – Variation of g with latitude, altitude and depth – Satellites – orbital and escape velocity – Period of revolution – Polar and Geo-stationary satellites.

Unit-IV

Elastic moduli – Poisson's ratio – beams – expression for bending moment - Determination of Young's modulus by uniform and non uniform bending – I section of girders. Torsion – Expression for couple per unit twist – work done in twisting – Torsional pendulum – Derivation of Poiseuille's formula (analytical method) – Bernoulli's theorem - proof applications – Venturimeter – Pitot tube.

Unit-V

Simple harmonic motions – Progressive waves properties – Composition of two S.H.M. and beats stationary waves – Properties – Melde's experiment for the frequency of electrical maintained tuning fork – Transverse and longitudinal modes – Acoustics – Ultrasonic – Properties and application.

Books for study:

1. Mechanics - D.S.Mathur S.Chand & Co.
2. Properties of matter - Brijilal & N.Subramanyan S.Chand
3. Ancillary physics - R.Murugasen

Reference Books:

1. Fundamental of Physics – Resnik and Halliday Wiley publishers
2. University Physics - Sears Zemansky and Ground Naresa publishers

ARITHMETIC ABILITY

Programme B.Sc.Maths
Semester : I
Course Code : 17UMAS11

Part: IV – SBS - I
Hours : 2
Credits: 2

COURSE OUTCOME:

CO1: Understand the basic rules of logic including the role of axioms or assumptions.

UNIT-I

Problem on numbers.

UNIT-II

Problems on ages

UNIT-III

Ratio and proportion.

UNIT-IV

Time and distance.

UNIT-V

Permutations and combinations.

TEXT BOOK:

1.“Quantitative Aptitude For Competitive Examination” by R. S. Aggarwal, revised and enlarged edition, S. Chand Publications ,New Delhi ,Reprint 2007.

FUNDEMENTAL OF MATHEMATICS -I

Programme B.Sc.Maths
Semester : I
Course Code : 17UMAN11

Part: IV – NME - I
Hours : 2
Credits: 2

COURSE OUTCOMES:

CO1: In Mathematics, a matrix (plural matrices) is a rectangular array of numbers, symbols or expressions arranged in rows and columns.

CO2: Applications of matrices are found in most scientific fields. A.P, G.P are interrelated concepts.

UNIT – I

Theory of indices – Ratio and Proportion.

UNIT – II

Differential calculus and Integral calculus– (Simple Problems)

UNIT – III

Theory of Matrices – Addition, Multiplication of two matrices.

UNIT – IV

Finding the n^{th} term and sum to n terms of an A. P and G.P

UNIT – V

Solving the quadratic equations – finding the roots – forming the equation when roots are given. (Only second degree)

TEXT BOOK:

1.Business Mathematics by M.Manoharan,C.Elango Paramount Publication 1994

TRIGNOMETRY AND FOURIER SERIES

Programme :B.Sc.Maths
Semester : II
Course Code : 17UMAC21

Part: III – CORE - III
Hours : 5
Credits: 4

COURSE OUTCOMES:

CO1: The branch of mathematics concerned with the properties of trigonometric functions and their application to the determination of the angles and sides of triangles used in surveying , navigation etc.

CO2: A Fourier series decomposes periodic function of periodic signals into the sum of a set of simple oscillating functions, namely sines and cosines. The Fourier series has many such applications is electrical engineering, signal processing etc.

UNIT – I

Expansions of $\sin^n x$, $\cos^n x$, $\tan^n x$, $\sin^n x$, $\cos^n x$,

UNIT – II

Hyperbolic Functions. Inverse Hyperbolic Functions.

UNIT – III

Logarithm of Complex Numbers.

UNIT – IV

Summation of series.

UNIT – V

Fourier series, Trigonometric series, even and odd functions – half range Fourier series.

TEXT BOOK:

Trigonometry by T.K. Manickavasagampillai. Calculus Volume II By Dr.S.Arumugam and Mr.Thangapandi Issac(1997)

THEORY OF EQUATIONS

Programme B.Sc.Maths
Semester : II
Course Code : 17UMAC22

Part: III – CORE - IV
Hours : 3
Credits: 3

COURSE OUTCOME:

CO1: To analyze the nature and find solution of algebraic equations.

UNIT – I

Theory of Equations – Imaginary roots – Irrational Roots – Relation between the roots and co-efficient – symmetric functions of the roots.

UNIT – II

Sum of the powers of the roots of an equation – Newton’s Theorem – Transformation of Equations – Roots Multiplied by a given number – Reciprocal roots – Reciprocal equations.

UNIT – III

Standard form of reciprocal equation-To increase and decrease the roots of a given equation by a given quantity – Removal of terms – Descartes rule of signs.

UNIT – IV

Multiple Roots –Strum’s theorem .

UNIT – V

Newton’s and Horner’s method -General solution of cubic equation: Cardon’s method.

TEXT BOOK:

1. Algebra by T.K.Manicavasagam Pillai & Others, S.Viswanathan Publications.

ANCILLARY PHYSICS HEAT AND THERMODYNAMICS

Programme : B.Sc.Maths
Semester : II
Course Code : 17UPHA21

Part: III – ALLIED II
Hours : 4
Credits: 4

Unit-I

Expansion of crystals – Determination of thickness by air wedge method – Expansion of anisotropic solids – solids of low expansivity and their uses – anomalous expansion of water – thermostats. Isolated and adiabatic changes – Derivation of equations for both c_p and c_v of a gas – relation between them – experimental determination of c_v by Joly's method – determination of c_p by regnault's method.

Unit-II

Lee's disc method for conductivity of bad conductor – air and cardboard – analogy between heat flow and electric current – Wiedmann Franz law – convection in atmosphere – lapse rate – Green house effect – atmospheric pollution.

Unit-III

Radiation – Stefan's law – determination of Stefan's constant by filament heating method – solar constant measurement water flow Pyrheliometer – temperature of the sun – solar spectrum – energy distribution in black body spectrum – Planck's law(no derivation) – derivation of Wien's and Rayleigh Jeans laws from Planck's law.

Unit-IV

Kinetic theory of gases – Mean free path – transport phenomena – diffusion, viscosity and thermal conductivity - Maxwell's law of distribution of molecular speed – experiment verification – degree of freedom – Boltzman's law of equipartition of energy – calculation of c_p For mono-atomic and diatomic gases.

Unit-V

Thermodynamics – Carnot's theorem – derivation of efficiency – second law of thermodynamics - entropy – changes of entropy in carnot's cycle – change of entropy in conversion of ice into steam – joule-kelvin effect – simple theory of porous – Plug experiment adiabatic – demagnetization – curie's law Giauque's method.

Books for study :

- 1.Ancillary Physics - R.Murugasen
- 2.Ancillary Physics - Ubald raj and Jose Robin
- 3.Thermal Physics - Brijilal & N.Subramanyan S.Chand

Reference Books :

- 1.Fundamental of Physics – Resnik and Halliday Wiley publishers
- 2.University Physics - Sears Zemansky and Ground Naresa publishers

PHYSICS ANCILLARY PRACTICALS
HEAT AND THERMODYNAMICS

Programme : B.Sc. Maths
Semester : II
Course Code : 17UPHA2P

Part: III – ALLIED III
Hours : 2
Credits: 1

Any Twelve experiments

1. Compound pendulum-determination of g
2. Torsional pendulum-determination of I and G
3. Young's modulus –Uniform bending –pin and microscope
4. Young's modulus –Non Uniform bending –Optic lever
5. Potentiometer- calibration of low range voltmeter
6. Potentiometer- calibration of low range ammeter
7. Carey foster bridge-determination of resistance and resistivity
8. Thermal conductivity of card board- Lee's disc method
9. Ballistic galvanometer comparison of capacitances
10. Thermal conductivity of card board- Lee's disc method
11. Ballistic galvanometer comparison of emf of the two cells
12. Spectrometer –Determination of μ
13. Coefficient of viscosity – stokes method
14. Melde's string apparatus – determination of frequency of vibrator
15. Sonometer – verification of laws
16. Potentiometer –Resistance & Resistivity

OFFICE AUTOMATION

Programme B.Sc.Maths
Semester : II
Course Code : 17UMAS21

Part: VI –SBS- II
Hours :2
Credits: 2

COURSE OUTCOME:

CO1: To achieve better management control to simplify operators and minimize the computational error to improve quality of out in terms of presentation.

UNIT-I:

MS-Word Introduction – Word for Windows – Creating and Saving a Document – Page Setup – Print preview, Print, Edit – Redo, Cut, Copy, Paste, Find and Replace.

UNIT-II:

View Menu- Normal, Print layout, Ruler, Header and Footer. Insert-Page no, Picture, Text box, Word art, Format font (size, colour, type), Bulleted numbering, Border and shading, Columns and Change cases.

UNIT-III:

Tools Menu-Spelling and Grammar-Mail merge. Table- draw, insert, delete, select, split columns and rows.

UNIT-IV:

Explanation of Excel page (rows, columns and cells) Entering data, usage of formulae and functions.

UNIT-V:

Creating an Excel chart, Data Manipulation and Types of Functions.

TEXT BOOK:

1.“MS OFFICE” by C. Nellaikannan, Nels Publications, 3rd edition, 2004.

FUNDAMENTAL OF MATHEMATICS -II

Programme B.Sc.Maths
Semester : II
Course Code : 17UMAN21

Part: IV – NME - II
Hours : 2
Credits: 2

COURSE OUTCOME:

CO1: To formulate and analyze the mathematical statistics and problems.

UNIT-I

Central tendencies:–Mean and Median.

UNIT-II

Dispersion –Range, Quartile deviation , standard deviation.

UNIT-III

Correlation –Pearson’s coefficient of correlation , rank correlation coefficient.

UNIT-IV

Index numbers –calculation of indices using simple aggregate method and average of price relative methods- weighted index numbers- Laspeyre’s, paasche’s and Fisher’s index numbers.

UNIT-V

Curve fitting – Fitting of a straight line and parabola.

TEXT BOOK:

1.Statistics by Dr.S.Arumugam, Publications: SciTech, 2006.

ANALYTICAL GEOMETRY OF 3D AND VECTOR CALCULUS

Programme B.Sc.Maths
Semester : III
Course Code : 17UMAC31

Part: III – CORE - V
Hours : 6
Credits: 4

COURSE OUTCOME:

CO1: It focuses on volumes, surface areas, surface coordinates and other mathematical aspects of three dimensional objects.

Unit-I

The plane – Angle between two planes - Length of perpendiculars – Bisector - Distance between two planes.

Unit-II

The straight line – symmetric forms – image of a point- image of a line about the plane and the straight line – Angle between a plane and a straight line.

Unit-III

Coplanar lines – shortest distance between two lines –skew lines.

Unit – IV

The sphere – Equation of the sphere – Equation of the tangent planes.

Unit-V

Vector differentiation – Gradient – divergent – curl – properties – Vector integration – line integrals – surface integral.

TEXT BOOK:

1. Analytical Geometry of 3D and Vector Calculus by Dr.S.Arumugam.

**PHYSICS ANCILLARY
ELECTRICITY AND ELECTRONICS**

Programme B.Sc.Maths
Semester : III
Course Code : 17UPHA31

Part: III – ALLIED-IV
Hours : 6
Credits: 4

UNIT – I

Gauss's law-proof-applications-Field due to a charged sphere and an infinite plane sheet-Field near a charged conducting cylinder-Coulomb's theorem-Electric potential-Relation between potential and field-Capacitors-Expression for C of a parallel plate ,Spherical(outer sphere earthed) and cylindrical capacitors-Energy of a charged capacitor-Loss of energy due to sharing of charges.

UNIT-II

Kirchoff's laws-application of Wheatstone's network-sensitiveness of bridge-Carey Foster bridge-Measurement of resistance and temperature coefficient of resistance-Principle of potentiometer-Calibration of ammeter and voltmeter-low and high range-measurement of resistance using potentiometer.

UNIT-III

Torque on a current loop-mirror galvanometer, dead beat and ballistic-Current sensitiveness-voltage sensitiveness-B.G theory-damping correction—experiments for (charge sensitiveness-comparison of emf's-comparison of capacitors)
e.m.f generated in a coil rotating in a uniform magnetic field-R.M.S and mean values-LCR circuit-impedances-Series and parallel resonant circuits-Power factor-Wattless current-Choke.

UNIT-IV

Junction diodes-Forward and Reverse bias-Diode characteristics-Types of diodes (LED and Zener)-Bridge rectifier using diodes(π filter)-Transistors-Characteristics (CE mode only)-Biasing and action of a single transistor (CE) amplifier-Frequency response-Hartley oscillator-Modulation (qualitative study)-op-amp and its characteristics-Virtual earth-voltage amplifier in inverting mode-Op-amp as adder and subtractor.

UNIT-V

Binary number system-reason for using binary numbers-binary to decimal and decimal to binary conversions-addition and subtraction of binary numbers. Logic circuits-Boolean algebra-De Morgan's theorem-OR,AND,NOT,NOR and NAND gates-NOR and NAND gates as universal building blocks-XOR gates.

TEXT BOOK

1.Electricity and Electronics ,R.Murugesan,I Ed, 2007

REFERENCE BOOKS

- 1.Solid state electronics,B.L.Theraja
- 2.Electricity and Magnetism,Brijlal and N.Subramaniyam

PROGRAMMING IN C

Programme B.Sc.Maths
Semester : III
Course Code : 17UMAA31

Part: III – ALLIED - V
Hours : 4
Credits: 4

COURSE OUTCOME:

CO1: C is a powerful general purpose programming language and able to know concepts in problem solving.

UNIT – I

Overview of C: History of C – Importance of C – Basic structure of C — **Constants, Variables and Data types:** Character set –C Tokens-Keywords and Identifiers-constants-variables-data types-declaration of variables. **Operators and expressions:** arithmetic, relational, logical, assignment operators – increment and decrement operators – conditional operators, bitwise operators, special operators – arithmetic expression – evaluation of expressions – precedence of arithmetic operators — mathematical functions.

UNIT – II

Managing I/O operations: reading and writing a character – formatted input, output. **Decision making and branching:** if statement, if.....else statement – nesting of ifelse statement – else if ladder – switch statement – the ?: operator – *goto* statement – the *while* statement – *do* statement – the *for* statement – jumps in loops.

UNIT – III

Arrays: one dimensional array – declaration, initialization – two dimensional array – declaration, initialization -multi dimensional array – dynamic arrays. **Strings:** declaration, initialization of string variables – reading and writing string – arithmetic operations on strings – putting strings together – comparison – string handling function – table of strings – features of string.

UNIT – IV

User defined functions: need – multi function program – elements of user defined function – definition – return values and their types – function calls, declaration, category – all types of arguments and return values – nesting of functions – recursion. **Structures and Unions:** defining a structure – declaring structure variables – accessing structure members initialization – copying a comparing – operations on individual members – arrays of structures – arrays within structures – structures within structures – structures and functions – unions – size of structures – bit fields.

UNIT – V

Pointers: accessing the address of a variable – declaring, initialization of pointer variables – accessing a variable through its pointers – chain of pointers – pointer expressions – pointer Increments and scale factor. **Files:** defining, opening, closing a file. I/O operations on files – error handling during I/O operations – random access to file.

TEXT BOOK:

1. **E. Balagurusamy**, “Programming in ANSI C”, Edition 3, Tata McGraw Hill publishing Company, 2005.

Reference Book:

1. Programming with C (Schuman’s outline series), Gottfried, Tata McGraw Hill.

PROGRAMMING IN C - LAB

Programme B.Sc.Maths
Semester : III

Part: III – ALLIED
Hours : 2

COURSE OUTCOME:

CO1: C is a powerful general purpose programming language and able to know concepts in problem solving

1. Write a c programme to find the sum ,average,standard deviation for a given set of numbers.
2. Write a c programme to generate “n” prime numbers.
3. Write a c programme to generate Fibonacci series.
4. Write a c programme to find simple interest.
5. Write a c programme to sort the given set of numbers in ascending and descending order.
6. Write a c programme to check whether the given string is a palindrome or not.
7. Write a c programme to count the number of vowels in the given sentence.
8. Write a c programme to find the factorial of a given number using recursive function.
9. Write a c programme to print the student’s mark sheet.
10. Write a c programme to add two matrices using function.

MECHANICS

Programme B.Sc.Maths
Semester : IV
Course Code : 17UMAC41

Part: III – CORE -VI
Hours : 6
Credits: 5

COURSE OUTCOME:

CO1: Mechanics is divided into two branches namely

- i) Statics is the branch of mechanics that is concerned with the analysis of loads (force and torque or “moment”) on physical systems in static equilibrium.
- ii) A Dynamics is a concept in mathematics where a fixed rule describes the time dependence of a point in a geometrical- space.

UNIT – I

Forces acting at a Point – Resultant and components – Parallelogram law of forces – Triangle law of forces – Lami’s Theorem – Resolution of a forces – Theorem of resolved parts – Resultant of any number of coplanar forces – condition of equilibrium.

UNIT – II

Forces acting on a rigid body – Parallel forces – Resultant of two like and unlike parallel forces – Moment of a forces – Varignon’s Theorem – Three forces acting on a rigid body – law of friction – coefficient of friction – angle of friction – cone of friction – problems.

UNIT – III

Projectiles – shape of projectile – range of a projectile – inclined plane.

UNIT – IV

Impact – Impulses- impact in a fired plane – Direct and oblique impact

UNIT – V

Central orbit – components of velocity and acceleration along and perpendicular to radius vector – differential equation of central orbit – pedal equation.

TEXT BOOK:

1. “Statistics” by M.K. Venkatraman.
2. “Dynamics” by M.K. Venkatraman.

OPTICS, SPECTROSCOPY AND MODERN PHYSICS

Programme B.Sc.Maths
Semester : IV
Course Code : 17UPHA41

Part: III –ALLIED-VI
Hours : 4
Credits: 4

Unit I

Deviation produced by thin lens-Focal length of two thin lenses in and out of contact-Cardinal points-Refractive index through a thin prism-Dispersion-Dispersive power-Combination of thin prisms to produce i) Deviation without dispersion and ii) Dispersion without deviation-Direct vision spectroscope-Chromatic aberration in lenses and its removal-Spherical aberration and its removal.

Unit II

Interference in thin films-Air wedge- Newton's rings-Determination of wavelength-Jamin's Interferometer-principle and uses. Diffraction : Theory of plane transmission grating(normal incidence only)-Experiment to determine wavelength.

Unit III

Double refraction-Nicol prisms, constructions, action and uses-QWP and HWP optical activity-Biot's laws-Specific rotator power-Half shade polarimeter-Determination of specific rotator power-Fiber optics-Light propagation in fibers-Fiber optic communication system.

Unit –IV

Infrared radiations, Production, properties and uses-Ultra violet radiations, sources, properties and uses. **Quantum theory**:-Plank's quantum theory-Raman effect-simple theory experimental study (Wood's Apparatus) Application. **Photo electricity**: Laws of photo electricity-Einstein's equation-Photocells and their uses, photoemissive, photoconductive and photovoltaic cells.

Unit V

De Broglie's theory-Electron diffraction-G.P Thomson's experiment. Michelson-Morley experiment-Significance of the negative results-Postulates of special theory of relativity-Lorentz transformation equations-Length contraction-Time dilation-Variation of mass with velocity and mass.

Reference Books:

- 1.A textbook of optics by Brijlal & N.Subramanayan, S.Chand 2002.
- 2.Optics and Spectroscopy by R.Murugesan, Vivekananda Press, Madurai, 20004.

Text Books:

- 1.Electricity and Electronics ,R.Murugesan,I Ed, 2007
- 2.Solid state electronics,B.L.Theraja
- 3.Electricity and Magnetism,Brijlal and N.Subramaniam

PHYSICS ANCILLARY PRACTICALS – 2

Programme B.Sc.Maths
Semester : IV
Course Code : 17UPHA4P

Part: III –ALLIED-VII
Hours : 2
Credits: 1

Any Twelve Experiments

1. Air wedge- determination of thickness of a wire
2. Newton's rings- determination of Radius of curvature
3. Spectrometer – determination of Dispersive power of a prism
4. Spectrometer- grating –Normal incidence method- determination of λ
5. LCR Series resonance- determination of self inductance
6. LCR parallel resonance- determination of self inductance
7. Bridge rectifier – π filter
8. Single stage amplifier – determination of gain and frequency response
9. Hartley oscillator-self inductance
10. Colpitt's oscillator-self inductance
11. Transistor characteristics-CE mode
12. Logic gates – AND, OR, NOT- discrete components
13. Logic gates – NAND, NOR - discrete components
14. OP amp- adder and subtractor
15. Zener diode characteristics
16. Owen's bridge (AC) - comparison of capacitances

PROGRAMMING IN C++ (THEORY)

Programme B.Sc.Maths
Semester : IV
Course Code : 17UMAA41

Part: III –ALLIED-VIII
Hours : 4
Credits: 4

COURSE OUTCOME:

CO1: To simulate the problem in the subjects like operating system, computer networks and real world problems.

UNIT – I

Principle of object oriented programming – software evolution – OOP Paradigm – Basic concepts of OOP – object oriented languages – Application of OOP – Introduction to C++ - tokens – keywords – Identifiers and Constants – basic data types – symbolic constants – type compatibility – Declaration – Scope resolution operator – Memory Management operator – manipulators – type implicit conversions operators precedence and associativity – control structures.

UNIT – II

Functions in C++ - Main Functions – Function Prototyping – Call by reference – Return by reference – Inline function – Default arguments – Constant arguments – Function Overloading – classes and Objects – Specifying a class – Defining Member Functions – Nesting of member functions – Arrays within a class – Static Data Members – Static Member Functions – Arrays of objects – Object as function Arguments – Friendly functions – Returning objects.

UNIT – III

Constructors – Parameterized Constructors – Multiple Constructors – Dynamic Initialization of Objects – Copy Constructor – Dynamic Constructors – Construction Two dimensional arrays – Destructors – Defining Operator Over loading Unary Operators, Binary Operators – Overloading Operators Using Friends – Manipulation of Strings using Operators – Rules – Types Conversion.

UNIT – IV

Inheritance – Single Inheritance – Multilevel, Multiple, Hierarchical Inheritances – Hybrid Inheritance – Virtual Base Classes – abstract Class – Constructors in Derived Class – Nesting of Classes – Pointers to Objects – this Pointer – Pointers to Derived Class – Virtual Functions – Pure Virtual Functions.

UNIT – V

Managing Console I/O Operation – Unformatted and Formatted Console I/O Operations – Managing Output with Manipulators – Working with Files – Classes of File Stream Objects – Opening and Closing a file – End of File Detections – File Pointers and their manipulations. Error Handling During file Operations – Command Line Arguments.

TEXT BOOK:

E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill, New Delhi – Second Edition.

PROGRAMMING IN C++ (LAB)

Programme B.Sc.Maths
Semester : IV
Course Code : 17UMAA4P

Part: III – ALLIED -IX
Hours : 2
Credits: 1

COURSE OUTCOME:

CO1: To simulate the problem in the subjects like operating system, computer networks and real world problems.

1. Write a C++ programme to find largest number among three numbers.
2. Write a C++ programme to convert Fahrenheit into Celsius.
3. Write a C++ programme to find variance and standard deviation
4. Write a C++ programme to display the output in triangle form.
5. Write a C++ programme to perform area calculation using function overloading.
6. Write a C++ programme to perform string manipulation using function overloading.
7. Write a C++ programme to find minimum of two numbers between two class objects using friend function.
8. Write a C++ programme to overload unary minus operator which changes sign of given vector.
9. Write a C++ programme to overload binary + operator which add two complex numbers.
10. Write a C++ programme to process students mark list using multiple inheritance.

REAL ANALYSIS

Programme B.Sc.Maths
Semester : V
Course Code : 17UMAC51

Part: III – CORE -VII
Hours : 5
Credits: 5

COURSE OUTCOME:

CO1: Real analysis (traditionally, the theory of functions of a variable) is a branch of mathematical analysis dealing with the real number and real valued functions of a real number.

UNIT – I

Sequences – Definitions and examples – convergent and divergent sequences – Cauchy sequences (Definition only) Introduction of countable and uncountable sets – Holder's and Minkowski's inequality – Metric space – Definition and examples.

UNIT – II

Open sets and closed sets definition and examples – completeness – definition and examples – cantor's intersection theorem and Baire's category theorem.

UNIT – III

Continuity – Definition and examples – Homeomorphism (Discontinuous functions on $\mathbb{R}$ are not included) Isometric and uniform Continuity

UNIT – IV

Connected – Definition and examples – connected subsets of $\mathbb{R}$ connectedness and continuity – Intermediate value theorem.

UNIT – V

Compactness – Definition and examples – compact subset of $\mathbb{R}$ – Equivalent Characterization of Compactness.

TEXT BOOK:

1.Modern Analysis by Dr.S. Arumugam. Publications, New Gamma – 2005.

MODERN ALGEBRA

Programme B.Sc.Maths
Semester : V
Course Code : 17UMAC52

Part: III – CORE -VIII
Hours : 5
Credits: 5

COURSE OUTCOME:

CO1: Present the relationship between abstract algebraic structure with familiar numbers systems such as the integers and real numbers.

UNIT – I

Relations – Types of Relations – Functions – Binary operations – Peano's Postulates – Principle of induction – simple problems – Law of Trichotomy.

UNIT – II

Subgroups – definition and examples – centers – normalizer – intersection and union of subgroups – permutations – cycles and transpositions – even and odd permutations – S_n and A_n – cyclic groups – definition and examples – cyclic groups are abelian – A group is cyclic if its order is equal to the order of one of its elements – subgroups of cyclic groups are cyclic – Theorems on the number of generator of cyclic groups.

UNIT – III

Cosets and their properties – congruence relation module a subgroup – Lagrange's theorem and its consequence – The order of an element of a finite group divides the order of the group - A group of prime order is cyclic – A group has no proper subgroup if it is a cyclic group of prime order – Euler's theorem – Fermat's theorem – normal subgroups – equivalent conditions for a subgroup to be normal – any subgroup of an abelian group is normal – A subgroup of index 2 is normal – Intersection of two normal subgroups – Intersection of a subgroup and a normal subgroup - If a subgroup has exactly one subgroup of given order then it is normal – Quotient group.

UNIT – IV

Homomorphism – Types of homomorphism – Homomorphism with reference to identity, Inverse and order of an element – its properties – Kernel of homomorphism – Homomorphic image of an abelian group is abelian – and that of a cyclic groups is cyclic – 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 .

UNIT – V

Cayley's Theorem – the fundamental theorem of homomorphism – Rings – definition and example – elementary properties

TEXT BOOK:

- 1.Modern Algebra by Dr.S. Arumugam and Issac ,Scitech Publication-2007
- 2.Set theory and number system by R.S.Aggarwal, S.Chand Publication

NUMERICAL ANALYSIS

Programme B.Sc.Maths
Semester : V
Course Code : 17UMAC53

Part: III – CORE -IX
Hours : 5
Credits: 5

COURSE OUTCOME:

CO1: Numerical methods is the study of algorithms that use numerical approximation(as opposed to general symbolic manipulations) for the problems of mathematical analysis (as distinguished from discrete mathematics).

UNIT – I

Algebraic and Transcendental Equations: Iteration Method – Aitken's method-Bisection method – Regular Falsi method – Newton Raphson method.

UNIT – II

Simultaneous equations: Gauss elimination method – Gauss Jordan method–Gauss Jacobi iteration method - Gauss seidel iteration methods.

UNIT – III

Interpolation: Newton's interpolation formulae – central difference interpolation formulae – Legrange's interpolation formulae – Inverse interpolation.

UNIT – IV

Numerical differentiation: Newton's forward and Backward difference formulae – Maxima and Minima of the interpolating polynomial - Numerical Integration: Trapezoidal rule – Simpson's rule .

UNIT – V

Numerical solution of differential equations– Taylor's series method - Euler's method – Runge Kutta method.

TEXT BOOK:

1.NUMERICAL ANALYSIS , by S. Arumugam and A. Thangapandi Issac

DIFFERENTIAL EQUATIONS & LAPLACE TRANSFORM

Programme B.Sc.Maths
Semester : V
Course Code : 17UMAC54

Part: III – CORE -X
Hours : 5
Credits: 5

COURSE OUTCOME:

CO1: A differential equation is a mathematical equation for an unknown function of one or several variables that relates the values of the function itself and its derivatives of various orders.

Unit-I

Exact differential equations-Equations of the first order but of higher degree-equations solvable for y – equations solvable for x and p – Clairaut's form-Equations that do not contain x, y explicitly- Equations homogeneous in x and y – Linear Equations with constant co-efficient.

Unit-II

Linear equations with variable co-efficient- equations reducible to the linear homogeneous equations-Simultaneous linear equations.

Unit-III

Linear equations of the second order – Reduction of the normal form – removing the first derivative method – variations of parameters.

Unit – IV

P.D.E. of the first order – formation of P.D.E. – Lagrange's method of solving the linear equations – standard forms – equations reducible to the standard form.

Unit-V

Laplace Transforms – theorems – problem – evaluation of integrals - inverse Laplace's Transforms – solving ordinary d.e. with constant co-efficient and variable co-efficient – Simultaneous linear equation using Laplace transforms.

TEXT BOOK

‘Calculus’ – Volume 2, T.K.Manicka Vasagam Pillai and S.Narayanan
Publications: S.Viswanathan, 1996.

STATISTICS-I

Programme B.Sc.Maths
Semester : V
Course Code : 17UMAE51

Part: III – Elective -1
Hours : 6
Credits: 4

COURSE OUTCOME:

CO1: Able to independently read mathematical and statistical literature of various types including survey articles, books and online sources.

UNIT-I

Measures of Averages-Measures of Dispersion-Skewness based on Moments.

UNIT-2

Curve fitting(All types of curves)

UNIT-3

Correlation and Regression- rank Correlation Co-efficient.

Unit-4

Theory of Attributes

UNIT-5

Index numbers, Analysis of time series.

Text Book:

1. Statistics by S.Arumugam , Publications: SciTech, 2009.

DISCRETE MATHEMATICS

Programme B.Sc.Maths
Semester : V
Course Code : 17UMAE52

Part: III – Elective-II
Hours : 6
Credits: 4

COURSE OUTCOME:

CO1: Communicate quantitative data verbally, graphically, symbolically and numerically .

CO2: Appropriately integrate technology into mathematical .

UNIT-I

Mathematical logic-Statements and notations-Connectives-negation-Conjunction-Disjunction-statement formulas and Truth table-conditional and Biconditional-well formed Formulas-Tautologies.(sec 1.1,1.2.1-1.2.4,1.2.6-1.2.8)

UNIT-2

Normal Forms-Disjunctive Normal Forms- Conjunctive Normal Forms- Principal Disjunctive Normal Forms- Principal Conjunctive Normal Forms-Ordering and uniqueness of Normal Forms-The theory of Inference for the Statement Calculus- Validity using Truth Tables-Rules of Inference–Consistency of Premises and indirect method of proof. (sec 1.3.1-1.3.5,1.4.1-1.4.3)

UNIT-3

Relations and ordering- Relations- Properties of binary relation in a set- Functions – Definitions and introductions-Composition of functions-Inverse Function-Binary and n-array operations-Hashing Functions-Natural numbers-Peano Axioms and mathematical Induction-cardinality.

Unit-4

Algebraic Systems-Definitions and examples-Semi groups and monoids- Definitions and examples-Homomorphism of semi groups and monoids- SubSemi groups and submonoids-Grammars-Formal definition of a language-Notations of syntax analysis.(sec3.1.1,3.1.2, 3.2.2, 3.2.3, 3.3, 3.3.2, 3.3.3

UNIT-5

Lattices as partially ordered sets- Definitions and examples-Some properties of Lattices-Lattices as Algebraic system- Sub Lattices- Direct product and homomorphism.
Boolean algebra: Definitions and examples—Sub algebra ,direct product and homomorphism-Boolean functions-Boolean forms and Free Boolean Algebras-values of Boolean expression and Boolean functions.(sec 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.2.1, 4.2.2, 4.3.1, 4.3.2)

Text Book:

1. Discrete mathematical structures with applications to computer science, by J.P. Trembly, R. Manohar, Tata Mc Graw Hill, New Delhi. 2010.

Reference Book:

Discrete mathematics by prof .V. Sundaresan, K.S. Ganapathy Subramanian, K. Ganesan, Tata Mc Graw Hill, New Delhi. 2000.

ASTRONOMY & ASTROPHYSICS

Programme B.Sc.Maths
Semester : V
Course Code : 17UMAS51

Part: III – SBS -III
Hours : 2
Credits: 2

COURSE OUTCOME:

CO1: To demonstrate and understanding of the basic properties of the sun and other stars.

UNIT I :

Spherical trigonometry –great circle small circle axis, poles, triangle, cosine formula, sine formula, cotangent formula, Napier’s formula(statement only)-simple problems.

UNIT II:

Celestial sphere - Celestial axis, Celestial poles, Celestial equator, Celestial horizon-zenith and nodes Celestial meridian, visible and invisible hemi sphere, declination circle-verticals, equinoxes and solstices, four system of coordinates.(Detailed explanation is not necessary).

UNIT III:

The Earth, The zones of Earth (Detailed explanation is not necessary), seasons ,calendar, civil year, jullian calendar, gregorian calendar, jullian date.

UNIT IV:

The Moon, sidereal month, synodic month-elongation - conjunctives, opposites daily motion of the moon, age of moon, phases of moon, metonic cycle, lunar and solar eclipse (Detailed explanation is not necessary).

UNIT V:

History of neutrino’s: Fermi postulate to discovery- **Source of Neutrino around us:** Cosmic, Solar and atmospheric - **Major neutrino detectors around the world:** Japan, Europe, USA, Russia - **Uses of neutrino research:** Cosmology, study of interior of earth, radiation leak detection etc, - India based neutrino (INO) project.

TEXT BOOK:

ASTRONOMY By Prof S Kumaravel and others and DEPARTMENT NOTES

ENVIRONMENTAL STUDIES

Programme B.Sc.Maths
Semester : V
Course Code : 17UENS51

Part: IV
Hours : 2
Credits: 2

COURSE OUTCOME:

CO1: To demonstrate a general understanding of the breadth and inter disciplinary nature of environmental issues.

UNIT -I: Earth and its Environment

- a) Earth –formation and Evolution of Earth over time – structure of Earth and its Components- Atmosphere, Lithosphere, Hydrosphere and Biosphere
- b) Resources- renewable and non renewable resources

UNIT -II: Ecology and ecosystem concepts

- a) Ecology- definition- Ecosystem ; Definition- Structure and function- energy flow – Food chain and food web- one example for an ecosystem
- b) Biogeochemical cycles- Nitrogen, Carbon, Phosphorous and water

UNIT-III: Biodiversity of India

- a) Introduction- definition- values of Biodiversity- Threat to Biodiversity- Conservation of Biodiversity
- b) Biodiversity of India –as a mega diversity nation- bio- geo graphical distribution- Hot spots of biodiversity – National Biodiversity conservation Board and its function

UNIT -IV: Pollution and Global issues

- a) Definition, causes, effects and control measures of Air, Water, Soil, Marine, Noise, Thermal and Nuclear pollution
- b) Global issues : Global warming and Ozone layer depletion

UNIT-V : Development and Disaster Management

- a) Sustainable Development - Sustainable Agriculture - Organic farming ,Irrigation – Water harvesting and waste recycling –Cyber Waste and Management
- b) Disaster Management – Flood and Drought – Earthquake and Tsunami – Landslides and Avalanches – cyclones and Hurricanes – Precautions, Warnings, Rescue and Rehabilitation.

TEXT BOOK:

1. Environmental studies – published by Madurai Kamaraj University.

REFERENCES BOOK:

1. Environmental studies by Dr.N.Arumugam & Prof.V.Kumarasan, Saras Publication – 2009
2. Environmental studies by Bharathiyar University, Coimbatore – 2004.

COMPLEX ANALYSIS

Programme B.Sc.Maths
Semester : VI
Course Code : 17UMAC61

Part: III – CORE -XI
Hours : 5
Credits: 5

COURSE OUTCOMES:

CO1: Complex Analysis, traditionally known as the theory of functions of a complex variable, is the branch of mathematical analysis that investigates functions of complex number .

CO2: Complex analysis is widely applicable to two-dimensional problems in physics.

UNIT – I

Analytic function – C-R equation – sufficient condition – harmonic functions.

UNIT – II

Elementary transformation – bilinear transformations – cross ratio – fixed point – special bilinear transformation – real axis to real axis – unit circle to unit circle and real axis to unit circle.

UNIT – III

Cauchy's fundamental theorem – Cauchy's integral formula – formula for higher derivatives – Morero's Theorem – Cauchy's inequality – Liouville's theorem – Fundamental Theorem of Algebra.

UNIT – IV

Taylor's Theorem – Laurant's Theorem – singular point – poles – Argument principle – Rouche's theorem.

UNIT – V

Calculus of Residues – Evaluation of definite integrals.

TEXT BOOK:

Complex Analysis Dr. S. Arumugam, A.T. Issac, A. Somasundaram.2006

LINEAR ALGEBRA

Programme B.Sc.Maths
Semester : VI
Course Code : 17UMAC62

Part: III – CORE -XII
Hours : 5
Credits: 5

COURSE OUTCOME:

CO1: Demonstrate ability to manipulate and to do matrix algebra, to solve system of linear algebra and to work within vector spaces and its properties.

UNIT – I

Vector spaces – Definition and examples – sub spaces – linear transformation – fundamental theorem of homomorphism.

UNIT – II

Span of a set – linear independence – Basis and Dimension – rank and nullity of Matrix and linear transformation.

UNIT – III

Inner product space – Definition and examples – orthogonality – orthonal complement.

UNIT – IV

Matrices – elementary transformation – inverse – Rank – test for consistency – solving linear equations – Cayley's - Hamilton's theorem – Eigen values and Eigen vectors.

UNIT – V

Bilinear forms – Matrix of a bilinear form – quadratic forms – reduction to quadratic forms.

TEXT BOOK:

1.Modern Algebra by Dr.S. Arumugam.Publications: Scitech, 2006

GRAPH THEORY

Programme B.Sc.Maths
Semester : VI
Course Code : 17UMAC63

Part: III – CORE -XIII
Hours : 5
Credits: 5

COURSE OUTCOME:

CO1: Able to describe and implement the algorithms to find the components of a graph and the strongly connected components of a digraph.

UNIT – I

Graphs – Degrees – Sub graphs – Isomorphism – Ramsey Numbers – Independent sets and coverings – Intersection Graphs and line graphs – Matrices of graphs – operation on graphs.

UNIT – II

Degree sequences – Graphic sequences – walks, trails and paths – connectedness and components – Blocks – connectivity – Eulerian graphs – Hamiltonian graphs.

UNIT – III

Trees – characterization of trees – centre of a tree – Matchings – Matchings in Bipartite graphs.

UNIT – IV

Planar graphs and properties – Characterization of planar graphs – thickness – crossing numbers and outer planarity chromatic number, chromatic polynomial and Chromatic index – five colour Theorem and four colour theorem.

UNIT – V

Definition – basic properties of digraphs – paths and connectedness in digraphs – Matrices associated with digraphs – Tournaments.

TEXT BOOK:

1.S. Arumugam and S. Ramachandran Invitation to Graph theory, Scitech Publication, Chennai, June -2012 (Reprint)

Reference Book:

1.Graph theory by Narsing Deo, Prentice Hall of India, 1997

OPERATIONS RESEARCH

Programme B.Sc.Maths
Semester : VI
Course Code : 17UMAC64

Part: III – CORE -XIV
Hours : 5
Credits: 5

COURSE OUTCOME:

CO1: Understand the mathematical tools that are needed to solve optimization problems
Understand the mathematical tools that are needed to solve optimization problems

UNIT – I

Linear Programming Problem – formulation of L.P.P. Mathematical form – Graphical Method – The Simplex Method

UNIT – II

Method of Penalty – Two Phase Method Duality – Dual simplex method.

UNIT – III

Transportation problem – mathematical form – initial solutions by all methods – MODI Method for both balanced and unbalanced T.P. – Assignment Problem.

UNIT – IV

Games Theory – Two person Zero sum game – saddle point – game in the saddle Point – solution of game by using formula – graphical method – Method of dominance and L.P.P. Method.

UNIT – V

Sequencing – Replacement problem – Queuing theory – Queuing system – elements of queuing system – classification of queuing models – Poisson queuing system – Model I CM/M/I – FIFO) and Model II (M/M/I – N/FIFO) – simple problems.

TEXT BOOK:

1.Operation Research by Kanti Swarup and Man Mohan Sultan Chand Publications, New Delhi, 2004.

STATISTICS-II

Programme B.Sc.Maths
Semester : VI
Course Code : 17UMAE61

Part: III – Elective-III
Hours : 6
Credits: 4

COURSE OUTCOME:

CO1: Understand, formulate and use quantitative models arising in social science, business and other contexts.

Unit- I:

Theory of probability –sample space- probability function – Laws of addition- Boole's inequality-Law of multiplication problems – Baye's Theroem-problems.

Unit-II:

Random variables- distribution function-discrete and continuous random variables – probability density function- Mathematical expectation(one dimension only)

Unit-III:

Moment generating function-cumulant-Theoretical distributions- Binomial-Poisson-Normal distributions

Unit – IV:

Tests of significance of Large Samples

Unit-V:

Tests of significance of small samples – t- test, F- test, Chi-square test

TEXT BOOK:

Statistics by Dr.S.Arumugam, A.Thangapandi Issac

Publishers: New Gamma Publishing House—July—2009.

NUMBER THEORY

Programme B.Sc.Maths
Semester : VI
Course Code : 17UMAE62

Part: III – Elective-IV
Hours : 6
Credits: 4

COURSE OUTCOME:

CO1: UAnalyze the structure or real –world problems and plan solution strategies.

CO2:Solve the problems using appropriate tools .

Unit- I:

The Division Algorithm-The g.c.d-The Euclidean Algorithm-The Diophantine Equation $ax+by=c$.

Unit-II:

The Fundamental theorem of arithmetic, the sieve Eratosthenes-The Goldbach conjecture-basic properties of congruence.

Unit-III:

Special Divisibility tests-Linear congruence-The Little Fermat's theorem-Wilson's theorem.

Unit – IV:

The functions μ and σ -The Mobius' s inversion formula- The greatest integer function.

Unit-V:

Euler's Phi- function- Euler's theorem –Some properties of the Phi- function.

TEXT BOOK:

Elementary Number theory by David M.Burton

Publishers: Universal Book Stall-2001.

REFERENCE BOOK:

Number theory by Kumaravelu and Suseela Kumaravelu

Publishers: S. Kumaravelu ,Muruga Bhavanam,chidambaram nagar,Nagarkoil--2002.

MATHEMATICS FOR COMPETITIVE EXAMINATIONS

Programme B.Sc.Maths
Semester : VI
Course Code : 17UMAS61

Part: IV – SBS - IV
Hours : 2
Credits: 2

COURSE OUTCOME:

CO1: Formulate and develop mathematical argument in a logical manner.

UNIT-I:

Non-verbal reasoning Tests – Completion of series , classification, non-verbal analogy.

UNIT-II:

Verbal reasoning tests – Series completion – Verbal classification – Verbal analogy – coding and decoding .

UNIT-III:

Percentages – profit and losses - time and work.

UNIT-IV:

Problems on train – simple interest– compound interest- height and distance.

UNIT-V:

Calendar - Clock – Stocks and Shares – True Discount.

TEXT BOOK:

1. Quantitative Aptitude – R.S,Aggarwal.
2. Test of Reasoning for Competitive Examinations – Edgar Thorpe
3. A Modern Approach to verbal and non-verbal reasoning by R.S,Aggarwal- Third Edition

VALUE EDUCATION

Programme : B.Sc.Maths
Semester : VI
Course Code : 17UVED61

Part : IV
Hours : 2
Credits: 2

COURSE OUTCOMES:

CO1: Understand the important moral values in all walks of life.

CO2: Evaluate the professional Ethics. .

CO3: Explain the doctrine and values of different religions and its impacts.

UNIT I

VALUES AND THE INDIVIDUAL

Values- Meaning-the significance of values-classification of Values-need of Value Education-Values and the individual-self-discipline, self-confidence, self-initiative, Empathy, Compassion, Forgiveness, Honesty and Courage.

UNIT:II VALUES AND RELIGION

Karmayoga in Hinduism-Love and Justice and Christianity-Brotherhood in Islam-Compassion in Buddhism-Ahimsa in Jainism and Courage in Sikhism-Need for Religious Harmony.

UNIT :III VALUES AND SOCIETY

Definition of Society- Democracy- Secularism –Socialism-Gender Justice-Human Rights-Socio- Political Awareness-Social Integration-Social Justice.

UNIT:IV PROFESSIONAL VALUES

Definition-Accountability-Willingness to learn- Team Spirit- Competence development-Honesty-Transparency-Respecting others-Democratic functioning-Integrity and Commitment.

UNIT:V.ROLE OF SOCIAL INSTITUTIONS IN VALUE FORMATION

Role of Family-Peer Group-Society-Educational Institutions- Role Models and Mass Media in Value formation.

Books for Study:

- | | |
|-------------------------|---|
| 1. Subramanyam.k. | - Values in Education. |
| 2. Joseph.K.P,(ed) | - Peace and Value Education:A creative response to consumerism and communalism. |
| 3. Tagore Rabindranath, | - Personality. |
| 4. Sekar,Vincent, | - Quest For Harmony: An Anthology of Religions In Dialogue. |