Sri Ramakrishna College of Arts and Science
(Autonomous)
(Formerly S.N.R. Sons College)
(Affiliated to Bharathiar University)
(Re-Accredited with 'A' Grade by NAAC)
(An ISO 9001:2015 Certified Institution)
Nava India, Coimbatore-641 006, Tamil Nadu, India.

"Scheme of Examination along with Distribution of Marks and Credits"

CBCS & OBE PATTERN

UNDER GRADUATE PROGRAMMES

B.Sc. Mathematics Degree Course
(For the students admitted during the academic year **2019 - 2020** and onwards)

Part	Study Components And Course Title	CIA	Comprehensive Exam		Total	Total	Credit
			Online	Descriptive Theory			
	Semester I						
I	Language-I 19TO1/19H01/19F01/ 19A01/19M01	30	-	70	70	100	3
II	19E01 - **English-I**	30	-	70	70	100	3
III	CORE I–19CMAT01 **Algebra and Trigonometry**	30	20	50	70	100	4
III	CORE II –19MAT101 **Differential Calculus**	30	20	50	70	100	4
III	CORE III –19CMAT02 **Numerical Methods-I**	15			35	50	2
III	ALLIED I –19PHC01 **Allied Physics –I**	30	20	50	70	100	3
III	ALLIED PRACTICALS I - 19PHC02 **Allied Physics Lab –I**	15	-		35	50	2
IV	19VE01– **Value Education** #	100			-	100**	1#
IV	19CPE01- **PACE– I** @	-			100	100**	1@
IV	19MATJC1 - **JOC – I** $						1$
						600	23

1

Semester II						
I	Language-II 19TO2/19H02/19F02/ 19A02/19M02	30	-	70	70	100	3
II	19E02 - **English-II**	30	-	70	70	100	3
III	CORE IV–19CMAT03 **Analytical Geometry-2D&3D**	30	20	50	70	100	4
III	CORE V –19MAT201 **Integral Calculus**	30	20	50	70	100	4
III	CORE VI–19CMAT04 **Numerical Methods II**	15			35	50	2
III	ALLIED II –19PHC03 **Allied Physics –II**	30	20	50	70	100	3
III	ALLIED PRACTICALS II 19PHC04 **Allied Physics Lab –II**	15	-		35	50	2
IV	19ES01 – **Environmental Studies #**	100					
IV	19CPE02-**PACE– II** @	-			-	100**	1#
IV	19MATJC2 - **JOC – II** $				100	100**	1@
							1$
						600	23
Semester III						
III	CORE VII –19CMAT05 **Vector Calculus And Fourier Series**	30	20	50	70	100	4
III	CORE VIII–19MAT301 **Differential Equations**	30	20	50	70	100	4
III	Core IX-19MAT302 **Mathematical Statistics - I**	30	20	50	70	100	4
III	**OPEN ELECTIVE – I**	30	-	70	70	100	4
III	ALLIED III 19MAT303 **Computer Science–I Programming in C++**	30	20	50	70	100	3
III	ALLIED PRACTICALS III 19MAT304 **Programming in C++ Lab**	15	-	-	35	50	3
III	Skill based Subject - 1 19CMAT06 **Operations Research-I**	30	20	50	70	100	2
IV	19BCT01/AT01 – **Basic Tamil I /Advanced Tamil I** $	100	-	-	70	100	3
IV	19CPE03- **PACE–III** @	-			-	100**	1$
IV	19MATJC3 - **JOC – III** $	-	-	-	100	100**	1@
					-	-	1$
						650	24

Semester IV

III	CORE–X–19MAT401 **Fourier and Laplace Transforms**	30	20	50	70	100	4
III	CORE–XI–19MAT402 **Statistical Inference (Mooc Course)**	30	20	50	70	100	4
III	CORE-XII–19MAT403 **Statics**	30	20	50	70	100	4
III	**ELECTIVE – I**	30	20	50	70	100	4
III	ALLIED IV- 19MAT404 **Programming in JAVA**	30	20	50	70	100	3
III	ALLIED PRACTICALS IV - 19MAT405 **Programming in JAVA - LAB**	15	-	-	35	50	2
III	Skill based Subject:2 19CMAT07 **Operations Research - II**	30	20	50	70	100	3
IV	19BCT02/AT02 **Basic Tamil II/Advanced Tamil II** $	100	-	-	-	100**	1$
IV	**19CPE04-PACE–IV@**	-	-	-	100	100**	2@
IV	**19MATJC4 - JOC – IV$**	-	-	-	-	-	1$
						650	26

Semester V

III	Core– XIII–19MAT501 **Real Analysis–I**	30	20	50	70	100	4
III	Core– XIV –19MAT502 **Complex Analysis–I**	30	20	50	70	100	4
III	Core-XV -19MAT503 **Abstract Algebra**	30	20	50	70	100	4
III	Core–XVI-19MAT504 **Dynamics**	30	20	50	70	100	4
III	**OPEN ELECTIVE – II**	30	-	-	70	100	3
III	Skill based Subject:3 19CMAT08 - **Accountancy**	30	20	50	70	100	3
IV	19CPE05 - **PACE–V** @	-	-	-	100	100**	2@
IV	19MATJC5 – **JOC – V** $	-	-	-	-	-	1$
						600	24

Semester VI

III	Core– XVII–19MAT601 **Real Analysis – II**	30	20	50	70	100	4
III	Core– XVIII -19MAT602 **Complex Analysis – II**	30	20	50	70	100	4
III	Core– XIX -19MAT603 **Linear Algebra**	30	20	50	70	100	4
III	**Elective–II**	30	20	50	70	100	4
III	Skill based Subject : 4 19MAT604 - **Project in Operations Research**	80			20	100	3
III	19MAT605 – **Advanced Excel $$** Self Study Paper	100			-	100**	2$$
V	Extension Activities NSS/NCC/SPORTS/ YRC/SIS#	100			-	100**	1
						500	20

$$ - Extra credit courses for the candidates who opted Advanced Excel in Part III

$-Extra credit courses for the candidates who opted other

Languages in Part– I and JOC

- No Comprehensive Examinations, Only Continuous Internal Assessment (CIA)

@No Continuous Internal Assessment (CIA), Only Comprehensive Examinations.

**Marks will not be included in CGPA calculations.

List of Elective papers (Can choose anyone of the paper as electives)		
Elective – I	19CMATE01	**Discrete Mathematics**
	19MATE01	Fuzzy Mathematics
	19MATE02	Actuarial Mathematics
Elective –II	**19MATE03**	**Graph Theory**
	19MATE04	Introduction to Cryptography
	19MATE05	Astronomy

List of Open Elective papers offered by the dept.

Open Elective –I 19MATIO1	MATHEMATICS FOR COMPETITIVE EXAMINATION
Open Elective –II 19MATIO2	R - PROGRAMMING IN DATA ANALYSIS

Summary

Part	Subject	Papers	Credit	Total credits		Papers	marks	Total marks	
Part I	Languages	2	3	6		2	100	200	
Part II	English	2	3	6		2	100	200	
Part III	Core	19	4/2	72	92	17/2	100/50	1800	2400
	Allied	8	3/2	20		4/4	100	600	
	Open Electives	2	3	6		2	100	200	
	Electives	2	4	8		2	100	200	
	Skill Based	4	3	12		4	100	400	
	Extra Credit Course	1	2	2 $$		1	100	100**	
								3600	
Part IV	Lang.	2	1	2$		2	100	200**	
	PACE	3	1	3		5	100	500**	
		2	2	4					
	EVS&VE	2	1	2		2	100	200**	
	JOC	5	1	5$		-	-	-	
Part V	@Extension	1	1	1		1	100	100**	
	Total			140					

$, $$ - Extra credit courses   ****- NOT INCLUDED IN TOTAL MARKS**

Note : Total credits may vary between 140 – 150

INFANT GABRIEL G
Syllabus Coordinator

Dr UMA N
BOS Chairperson

Dr HARI PRASAD D
Academic Council – Member Secretary

19CMAT01 – ALGEBRA AND TRIGONOMETRY

Semester	I
Credit	4
PaperType	Core
Max.Marks	CIA-30 CE-70 TOT=100

COURSE OBJECTIVE
To train the students on summation of series; on solving algebraic equations subject to some conditions and trigonometric functions.

UNIT I SERIES AND ITS SUMMATION (12)
Binomial Theorem– Exponential Theorem(Statement only)– Logarithmic Series (Statement only)- their immediate application to summation only.

UNIT II THEORY OF EQUATIONS (12)
Roots of an Equation–Relations connecting the roots and coefficients–Transformation of Equations–Decreasing and Increasing roots of an equation by n – Reciprocal Equations.

UNIT III (12)
Descartes' rule of signs –Rolle's Theorem (statementonly)–problems–Multiple roots-Approximate solutions of roots of polynomials by–Horner's method

UNIT IV EXPANSION IN SERIES (12)
Expansion of $\cos^n\theta$, $\sin^n\theta$, in a series of $\cos n\theta$ and $\sin n\theta$, multiples of θ – Expansion of $\cos n\theta$ and $\sin n\theta$ in Powers of sines and cosines–Expansion of $\sin\theta$, $\cos\theta$ and $\tan\theta$ in powers of θ.

UNIT V HYPERBOLIC FUNCTIONS (12)
Relation between circular and hyperbolic function–Separation of real and imaginary parts $-\sin(x+iy)$, $\cos(x+iy)$, $\tan(x+iy)$, $\tan^{-1}(x+iy)$–Problems, Logarithm of Complex quantities–Problems.

COURSE OUTCOMES
After the completion of the course the students will be able to
- Sum the series using binomial, exponential and logarithmic expansions. $[L_2]$
- Acquire knowledge about theory of equations and solve the equations. $[L_2]$
- Estimate approximate solutions of algebraic equations. $[L_3]$
- Expand trigonometric functions as infinite series. $[L_2]$
- Separate real and imaginary parts of hyperbolic functions. $[L_3]$

Total Periods: 60

TEXT BOOKS
1. T.K.Manicavachagam Pillai, T.Natrajan, K.S.Ganapathy, "Algebra Vol.I",
    S. Viswanatham Printers & Publishers Private Ltd, 2004, reprint2012.
2. T.K..Manicavachagam Pillai and T.Narayanan, "Trigonometry",
    S. Viswanatham Printers & Publishers Private Ltd, 2004, reprint2012.

REFERENCE BOOKS
1. P.Kandasamy and K.Thilagavathy, "Mathematics for B.Sc.Branch I –Vol.I, II",
    S.Chand and Company Ltd, NewDelhi, 1st edition, 2004, reprint2015.
2. P.R.Vittal, V.Malini,"Alegbra&Trigonomety",Vol II, Margham Publication, 2003.
3. P.R.Vittal,"Trigonomety",Margham Publication, Third Edition, 2004.

Dr.N.UMA

(COURSE COORDINATOR)

Dr.N.UMA

(BOS CHAIRMAN)

19MAT101 – DIFFERENTIAL CALCULUS

Semester	I
Credit	4
PaperType	Core
Max. Marks	CIA-30
	CE-70
	TOT=100

COURSE OBJECTIVES

To teach the students about Rolle's theorem and Taylor's theorem, Successive Differentiation, Partial Derivatives, Curvature, Evolutes and Envelopes.

UNIT I   (12)

Definition of the limit of a function– Continuous functions and classification of discontinuities–Differentiability– Chain rule of Differentiability– Rolle's Theorem– First and Second Mean value Theorems–Taylor's Theorems with Lagrange's and Cauchy's forms of Remainder

UNIT II   (12)

Successive Differentiation – Leibnitz's Theorem and its applications – Increasing and Decreasing Functions– Maxima and Minima of Functions of two variables

UNIT III   (12)

Partial Derivatives– ChainRule – functions of two variables – Successive Partial Derivatives– Homogenous Functions–Euler's Theorem on Homogenous Functions of two variables

UNIT IV   (12)

Curvature–Radius of Curvature in Cartesian and in Polar Coordinates– Tangents and Normal's– Pedal Equation and Pedal of a curve–Radius of Curvature in Pedal form

UNIT V   (12)

Centre of Curvature– Circle of Curvature– Evolutes of Parabola, Ellipse and Hyperbola–Envelopes– Evolutes and Involutes

COURSE OUTCOMES

After the completion of the course the student will be able to
- Explain Rolles' theorem, Mean value theorem and Taylor's theorem [L3]
- Predictmaximaandminimafunctionsoftwovariables [L3]
- Evaluate the partial derivatives of homogenous functions [L3]
- Determine the tangent's and normals of the curve using derivatives [L3]
- Explain the application of Parabola, Ellipse and Hyperbola using Differential Calculus [L3]

Total Periods :60

TEXT BOOK

1. S.Narayanan and T.K.M.Pillai, "CalculusVol. I", Viswanathan Publishers, Reprint 2012.

REFERENCE BOOKS

1. P.Kandasamy and K.Thilagavathy, "Mathematics for B.Sc.Branch I–Vol .I", S.Chand and CompanyLtd,NewDelhi,1steditiion2004,Reprint2014.
2. S.ArumugamandIsaac, "Calculus, Vol.I", New Gamma PublishingHouse,1stedition 1991.
3. G.Balaji, "Engineering Mathematics"   Balaji Publishers,5th edition, 2013.

Mr.VASANTH KUMAR BONIFACE
(COURSE COORDINATOR)

Dr.N.UMA
(BOS CHAIRMAN)

19CMAT02 – NUMERICAL METHODS - I

Semester	I
Credit	2
Paper Type	Core
Max. Marks	CIA -15
	CE -35
	TOT =50

COURSE OBJECTIVE

To understand the concept about solving the linear equations numerically and finding interpolation by using difference formulae.

TOPICS

- Bisection method– Convergence condition – Regula Falsi Method –Newton – Raphson method
- Gauss elimination method – Gauss Jordan method –Gauss Jacobi method – Gauss Seidel method
- Differences – operators – forward and backward difference tables – Differences of a polynomial
- Factorial polynomialNewton's forward and backward formulae – equidistant terms with one or more missingvalues
- Central differences and central difference table
- Newton's divided differences formula
- Lagrange's formula and inverse interpolation.

COURSE OUTCOMES

After the completion of the course the student will be able to
- Solve algebraic and transcendental equations.[L3]
- Find the solution of system of linear Algebraic Equations.[L2]
- Determine the finite differences.[L2]
- Identify the problems in Interpolation with equal and unequal intervals and solve it.[L3]

Total Periods : 30

TEXT BOOK

Kandasamy. P, Thilagavathi. K and Gunavathi. K "Numerical methods" – S. Chand and Company Ltd, New Delhi – Revised Edition 2007. (Chapters: 3,4,5,6,7 and 8).

REFERENCE BOOKS:

1. Venkataraman M. K.,"Numerical Methods in Science and Engineering" National Publishing company V Edition 1999.
2. SankaraRao K., "Numerical Methods for Scientists and Engineers" 2nd Edition Prentice Hall India 2004.

Mr. E.VIVEK
(COURSE COORDINATOR)

Dr.N.UMA
(BOS CHAIRMAN)

19PHC01 - Allied Physics - I
(Common for Maths & Maths CA)

Semester	I
Credit	3
Max. Marks	CIA -30
	CE -70
	TOT =100

COURSE OBJECTIVE:
- To understand the fundamentals of Physics.

10

UNIT - 1 PROPERTIES OF MATTER
Elasticity: Introduction – Stress & strain – Hooke's law – Three types of Elasticity – Determination of Young's modulus by uniform and non-uniform bending – Torsion in a wire – Determination of rigidity modulus of torsion pendulum. **Surface Tension:** Definition & dimensions of surface tension – Pressure difference across a liquid surface – Drop method of determining the surface tension of a liquid.

9

UNIT - 2 MECHANICS
Concepts of Work, Power & Energy – Newton's laws of motion – Simple harmonic motion – Differential equations of S.H.M – Simple pendulum. Rigid body – Moment of inertia – Moment of inertia of a diatomic molecule.

9

UNIT - 3 HEAT & THERMODYNAMICS
Concept of heat – Thermodynamic equilibrium – First law of thermodynamics – Specific heats of a gas – Carnot's cycle – Second law of thermodynamics – Carnot's theorem – Steam engine

8

UNIT -4 SEMICONDUCTORS
Semiconductor – Types of semiconductor – PN junction – Forward & Reverse bias – Voltage-Current characteristics – Zener diode – Zener diode as voltage regulator. Transistor – Types of transistors – CE characteristics.

9

UNIT: 5 ASTROPHYSICS
Introduction – Classification of Stars – H-R Diagram – Luminosity of stars – Stellar evolution – White Dwarf's – Chandrasekhar limit – Neutron stars – Black holes – Supernova explosion – Photon diffusion time – Gravitational potential energy of a star – Internal temperature of a star – Internal pressure of a star.

COURSE OUTCOME
At the end of the course the students able to

CO1	Identify the properties of matter	L3
CO2	Express the concepts of mechanics	L2
CO3	Analyze the laws of thermodynamics	L3
CO4	Differentiate the types of semiconductor	L2
CO5	Discuss about the stars and black holes	L1

Total Periods: 45

TEXT BOOK:
1. R. Murugeshan & D.S Mathur, "Properties of Matter" – S.Chand & Company Ltd., 2014. (Unit-I)
2. D.S. Mathur, "Mechanics", S.Chand & Company Ltd., 2015. (Unit-II)
3. Brijlal and Subramanian, "Heat and Thermodynamics, S.Chand& Company Ltd, 2010. (Unit-III)
4. V.K.Mehta and Rohit Mehta, "Principle of Electronics", S.Chand & Company Ltd, 2015. (Unit-IV)
5. Baidyanath Basu, Tanuka chattopadhyay, Sudhindranath, "A Introduction to Astrophysics" PHI Learning PVT Ltd., New Delhi (2011) (UNIT V).

REFERENCE BOOK
1. A.B.Gupta &H.P.Rai, "Heat and Thermodynamics", New Central book, 1st Edition, 2008.
2. Brijlal and Subramaniam, "Properties of Matter", S.Chand & Company, 2003.

Verified by Course Coordinator
Mr/M. Gowtham

Verified by BOS Chairman
Dr. S. Poonguzhali

Semester	I
Credit	2
Paper type	Allied Practical
Max. Marks	50

19PHC02 - Allied Practical - Allied Physics Lab I
(Common for Maths & Maths CA)

COURSE OBJECTIVE:

- To identify the different properties of matter and characteristics of semiconductor diodes.

All the Experiments:

1. Young's modulus – Uniform bending – Pin & Microscope
2. Young's modulus – Non Uniform bending – Pin & Microscope
3. Surface tension of a liquid – Drop weight method
4. Viscosity of highly viscous liquid – Stroke's method.
5. Compound Pendulum – Determination of 'g' and 'k'
6. Characteristics of PN Junction Diode
7. Characteristics of Zener Diode
8. Sonometer frequency tuning fork

COURSE OUTCOME
At the end of the course the students able to

CO1	Recognize physical properties of matter by interpreting the results of experiment	L3
CO2	Design circuits by knowing the characteristics of electronic components.	L3

Verified by Course Coordinator
Mr. M. Gowtham

Verified by BOS Chairman
Dr. S. Poonguzhali

Sri Ramakrishna College of Arts and Science (Autonomous)
Coimbatore – 641006
VALUE EDUCATION

[one Credit Course offered during Odd / Even Semester with effect from 2019-2020& onwards]

Syllabus :: Batch 2019-20

(Common to all UG courses)

COURSE OBJECTIVES:

- To orient about the society, social life, integrity in personal and public life.
- To learn the concepts of human values and respect for others
- To provide in-depth understanding about moral awareness
- To inculcate a sense of socially responsible citizens.

Semester	I (or) II
Credit	1
Max. Marks	CIA – 100
	TOT =100

UNIT - I   VALUE EDUCATION & HUMAN EDUCATION   3

Value Education - Definition - relevance to present day - Concept of Human Values - Self Introspection - Self Esteem

UNIT – II   SOCIETY & FAMILY VALUES   3

Structure and components of Society, Marriage and Family System – AngerNeutralization, Adjustability - Threats of family life.

UNIT - III   ETHICS & LEADERSHIP QUALITIES   3

Ethical values: Ethics, Social Ethics, Public Policy - Leadership qualities: Integrity, Character, Courage - Personality development. Inter-culture Tolerance

UNIT - IV   SOCIAL VALUES   3

Social Values, Faith, Service, Commitment and Decency - Fundamental Rights and Responsibilities of citizens

UNIT - V   SOCIAL PROBLEMS AND ROLE OF STUDENTS   3

Social Problems: Definition - Poverty, Illiteracy, Unemployment, Exploitation, Obscenity, Immorality - Crimesand Online Crimes - Student unrest, Ragging and Peaceful Campus - Role of Students in tackling social problems

COURSE OUTCOMES: **Total Periods : 15**

- Develop a sense of self respect and respect for others   [L3]
- Able to occupy one's own social space and help others live peacefully   [L3]
- Develop scientific temper and logical reasoning and to apply in day to day life   [L2]

REFERENCE BOOKS

1. Mani Jacob (Ed). 'Resource Book for Value Education', Institute for Value Education, New Delhi. 2002.
2. NCERT. "Value Education". Dharma Bharti National Institute of Peace and Value Education, Secunderabad, 2002.
3. Daniel and Selvamony. "Value Education Today - Madras Christian College, Tambaram and ALACHE, New Delhi, 1990.
4. Ignacimuthu S. "Values for Life". Better Yourself Books, Mumbai, 1991.
5. M.M.M.Mascaronhas. Centre for Research Education Science and Training for Family Life Promotion - Family Life Education, Bangalore, 1993.

Course Coordinator
Dr.R.Thirumoorthi
Prof. & Head – Social Work
Sri Ramakrishna College ofArts and
Science (Autonomous), Coimbatore

Semester	II
Credit	4
Paper Type	Core
Max. Marks	CIA -30
	CE -70
	TOT =100

19CMAT03 – ANALYTICAL GOEMETRY 2D & 3D
(Common to Mathematics & Mathematics (CA))

COURSE OBJECTIVE
To train the students in solving problems on analytical geometry of 2D & 3D.

UNIT I   (13)
Analytical Geometry of 2D – Polar Coordinates equation of a Conic –Directrix– Chord – Tangent – Normal — Deriving equation of a Conic - Simple Problems

UNIT II   (12)
Straight line – Symmetrical form of the equation of a line – Equation of a Straight line passing through two given points – The condition for the line $(x-x_1)/l=(y-y_1)/m$ to the Parallel Plane $ax+by+cz+d=0$ – Angle between a plane and a line – Coplanar lines – The shortest distance between two given lines – Simple problems

UNIT III   (13)
Sphere – Definition – The equation of a Sphere – Centre and Radius – The length of the tangent from the point to the Sphere – Equation of a Sphere passing through a given Circle – Intersection of the Sphere at a point – Equation of the tangent plane to the Sphere at a point – Simple problems

UNIT IV   (11)
Cone – Definition – Cone whose vertex is at the origin – Envelope cone of a Sphere – Right Circular Cone – Related Simple problems.

UNIT V   (11)
Cylinder – Definitions – Equation of a Cylinder – Equation of the Right Circular Cylinder with axis and radius of the guiding circle λ – Enveloping Cylinder – Equation of a Right Circular Cylinder – Simple Problems

COURSE OUTCOME
After the completion of the course the students will be able to
CO 1- Identify the difference between the 2D & 3D
CO 2- Explain straight line and its applications
CO 3- Describe Geometry of Sphere and its applications
CO 4- Analyze the Geometry of Cone and its applications
CO 5- Describe the Geometry of Cylinder and its applications

TOTAL PERIODS : 60

TEXT BOOKS
1. Manikavasagam Pillai and T.Natarajan, "Analytical Geometry Part I - 2D", S. Viswanatham Printers & Publishers Private Ltd, 1st edition, 1955, Reprint 2014.
2. Manikavasagam Pillai and T.Natarajan, "Analytical Geometry Part II - 3D", S. Viswanatham Printers & Publishers Private Ltd, 1st edition, 1955, Reprint 2014.

REFERENCE BOOKS

1. P. Durai Pandian, Laxmi Duraipandian, Muhilan D, "Analytical Geometry 2D", Emerald publishers, Chennai-2, 1997. (Current edition)
2. P. Durai Pandian, Laxmi Duraipandian, Muhilan D, "Analytical Geometry 3D", Emerald publishers, Chennai-2, 1998, (Current edition)

Prepared by

Ms Malarvizhi M

Approved by

Dr UMA N

19MAT201 – INTEGRAL CALCULUS

Semester	II
Credit	4
Paper Type	Core
Max. Marks	CIA -30
	CE -70
	TOT =100

COURSE OBJECTIVE

To teach the students about different types of integration, multiple integration, its geometrical applications, multiple integral, beta and gamma functions.

UNIT – I (10)

Definition – Indefinite Integral – Properties – Integration by Substitution method – Integration by Partial Fractions – Integration by Parts – Definite Integral – Simple Problems

UNIT – II (11)

Evaluation of Integrals of the form $\sqrt{(ax^2 + bx + c)}$, $\frac{lx+m}{(ax^2+bx+c)}$, $(lx + m)/\sqrt{(ax^2 + bx + c)}$, $\frac{dx}{a+bCosx}$, $\frac{dx}{a+bSinx}$, $\frac{1}{acosx+bsinx+c}$, $\frac{1}{a^2cos^2x+b^2sin^2x}$.

UNIT – III (13)

Reduction Formula - $\int sin^n x dx, \int cos^n x dx$ - Evaluation of $\int sin^m x cos^n x dx$-Evaluation of $\int e^{ax}cosbxdx, \int e^{ax}sinbxdx$. Multiple Integrals – Definition – Evaluation of double integrals in Cartesian, Polar Coordinates – Changing the order of Integration – Application of double integral to calculate area under curves – Simple Problems.

UNIT – IV (13)

Triple Integrals – Simple Problems.Change of variables- Jacobian – Definition – Properties (statement only) – Transformations from Cartesian to Polar Coordinates – Transformation from Cartesian to Spherical Coordinates – Simple Problems.

UNIT – V (13)

Beta, Gamma functions – Definition – Recurrence formula for Gamma functions – Complete definition of Gammma function- value of $\Gamma(1/2)$ – Beta function- Other forms of beta functions - Properties – Relation between $\beta(m,n)$, Γm, Γn – Application of Beta and Gamma functions - Simple Problems.

COURSE OUTCOMES

After the completion of the course the students will be able to

CO 1: Demonstrate the concept of Integration and its types
CO 2: Evaluate the different types of Integrals
CO 3: Evaluate DoubleIntegrals by changing the order
CO 4: Transformating the integrand from Cartesian to polar coordinates and integrate
CO 5: Acquire knowledge about Beta and Gamma functions and its applications

TOTAL PERIODS : 60

TEXT BOOK

1. S.Narayanan and T.K.M. Pillai, "Calculus Vol. II",Viswanathan Publishers, Reprint 2012.

REFERENCE BOOKS

1. Shanti Narayan , Dr. P. k. Mital, "Differential & Integral Calculus",Sultan Chand Publishers, 1st edition, 1942, Reprint 2016.
2. P.Kandasamy and K.Thilagavathy , "Mathematics for B.ScVo.l II" , S.Chand and Co, 1st editiion 2004, Reprint 2014.

Prepared by

Mrs KARPAGAM K

Approved by

DrUMA N

19CMAT04 – NUMERICAL METHODS II
(Common to Mathematics & Mathematics CA)

Semester	II
Credit	2
Paper Type	Core
Max. Marks	CIA -15
	CE -35
	TOT =50

COURSE OBJECTIVES
To make the students understand, analyse and apply
- The numerical differentiation and integration .
- Numerical solution on O.D.E.

Unit I: Numerical Differentiation
(6)

Newton's forward and backward formulae to compute the derivatives – Derivative usingStirling's formulae – To find maxima and minima of the function given the tabular values.

Unit II: Numerical Integration
(6)

Newton – Cote's formula – Trapezoidal rule – Simpson's 1/3rd and 3/8th rules – Gaussianquadrature– Two points and three points formulae

Unit III: Difference Equations
(6)

Order and degree of a differential equations – solving homogeneous and non – homogeneous linear differential equations.

Unit IV:Numerical solution of O.D.E
(6)

Taylor series method – Euler's method – Improved and modified Euler method – Runge Kutta method(fourth order RungeKutta method only)

Unit V: Numerical solution of O.D.E
(6)

Milne's predictor corrector formulae – Adam-Bashforth predictor corrector formulae –Solution of ordinary differential equations by finite difference method (for second order O.D.E).

COURSE OUTCOMES
After the completing of the course students should be able to
- CO1 :Determine the derivatives using Newton's method
- CO2 :Evaluate integrals using numerical methods
- CO3 :Find the solution of difference equation
- CO4 :Solve Differential Equation using Taylor's, Euler's, RungeKutta methods and finite difference

TEXT BOOK
1. Kandasamy. P, Thilagavathi. K and Gunavathi. K "Numerical methods" – S. Chand and Company Ltd, New Delhi – Revised Edition 2007..

Reference Books
1. Venkataraman M. K.,"Numerical Methods in Science and Engineering" National Publishingcompany V Edition 1999.
2. SankaraRao K., "Numerical Methods for Scientists and Engineers" 2nd Edition Prentice Hall,India 2004.

Prepared by

Mr INFANT GABRIEL G

Approved by

Dr UMA N

19PHC03 - ALLIED PHYSICS – II
(Common for Maths & Maths CA)

COURSE OBJECTIVE:
- To understand the fundamentals of Physics

Semester	II
Credit	3
Max.Marks	CIA = 30
	CE = 70

UNIT – 1 ELECTRICITY AND MAGNETISM
9

Gauss law – Electric field due to a uniformly charged sphere – Principle of a capacitor – Capacitor in series and parallel connection – Energy stored in a charged capacitor – Concept of magnetic materials – Magnetic induction - Permeability – susceptibility – Magnetic properties of Dia, Para, Ferro, Anti-Ferro and Ferri magnetic materials.

UNIT – 2 OPTICS
9

Properties of light: Reflection of light – Refraction of light – Refractive index – Fermat's principle of least time – interference – Newton's rings – Diffraction – Difference between interference and diffraction – polarization – Brewster's law

UNIT – 3 DIGITAL ELECTRONICS
9

Introduction – Analog and Digital signals – Binary number system – Decimal to Binary conversion – Binary to Decimal conversion – Logic gates – AND ,OR,NOT,NAND and NOR gates – NAND and NOR gate as a universal gates – Demorgan's theorem – Laws of Boolean algebra – Simplification of Boolean expressions.

UNIT – 4 ATOMIC PHYSICS
8

Introduction – Rutherford's experiments on scattering of particles – Postulates of Bohr atom model – Vector atom model – Quantum numbers associated with the vector atom model – Pauli's exclusion Principle.

UNIT – 5 NUCLEAR PHYSICS
10

Classification of Nuclei – Binding energy – Characteristics of Nuclear forces – Radioactivity – Properties of Alpha, Beta and Gamma – Nuclear Fission – Nuclear Fusion. **Nuclear Models:** Liquid drop model – Semi-empirical model – Merits and demerits of shell model – Evidences for shell model.

COURSE OUTCOME:
At the end of the course the students are able to

CO	Statement
CO1	Acquire knowledge on elementary ideas of electricity and magnetism
CO2	Discuss the properties of Light
CO3	Explain the function of logic gates
CO4	Discuss the concept of atomic physics and atom models
CO5	Know to about basic nuclear physics properties and nuclear models

Total Periods: 45
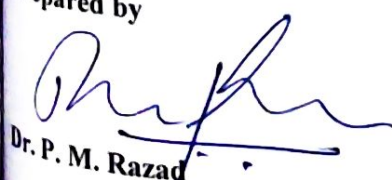
TEXT BOOK:
1. R. Murugeshan, "Electricity and Magnetism" – S. Chand & Sons, 2017 (Unit I).
2. N. Subrahmanyam, Brijlal & M. N. Avadhanulu, "A Text Book of Optics" – S. Chand & Company Ltd, 25th Edition, 2015 (Unit II).
3. V. K. Mehta, Rohit Mehta, "Digital Electronics" – S. Chand & Company Ltd, 2015 (Unit III).
4. R. Murugeshan, S. Kiruthiga, "Modern Physics" – S. Chand & Company Ltd, 18th Edition, 2016 (Unit IV & V).
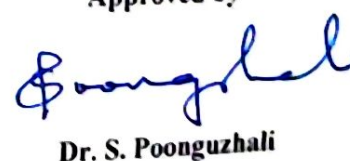
REFERENCE BOOK:
1. Jenkins and White, "Fundamentals of Optics", Tata Mc Graw- Hill Pub. Co. Ltd. Delhi, 2006
2. Dr. B. R. Gupta and Vendana Singahal "Digital Electronics", S. K. Kataria and Sons Millennium Edition, July 2009.

Prepared by

Dr. P. M. Razaq

Approved by

Dr. S. Poonguzhali

19PHC04 - ALLIED PRACTICAL – ALLIED PHYSICS LAB II
(Common for Maths & Maths CA)

COURSE OBJECTIVE:

- To get the knowledge of spectrometer experiments and to demonstrate simple digital experiments.

Semester	II
Credit	2
Paper Type	Practical
Max. Marks	CIA:15
	CE :35

LIST OF EXPERIMENTS:

1. Meter Bridge – Specific resistance of given coil.

2. Tan C positions – Moment of the magnet

3. Newton's ring – radius of curvature

4. Spectrometer – μ of solids

5. Spectrometer – μ of liquids

6. Thermal conductivity of a bad conductor – Lee's disc

7. Verification of De-Morgan's theorem

8. Verification of logic gates
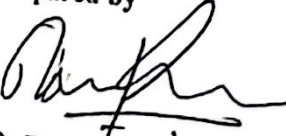
COURSE OUTCOME:

At the end of the course the students are able to

CO	Statement
CO1	Calculate the optical properties of solid and liquid
CO2	Determine the co-efficient of thermal conductivity of a bad conductor
CO3	Identify the logic gates and demonstrate its applications

Total Periods: 30

Prepared by

Dr Razad/P M

Approved by

Dr Poonguzhali S

19ES01 - ENVIRONMENTAL STUDIES

COURSE OBJECTIVES

- To recognize the major concepts of ecosystem and have in-depth understanding of environmental interactions and alternate energy resources.
- To understand the role of various environmental pollutants and its effects.
- To understand the environmental social issues and develop problem – solving skills using scientific techniques.
- To understand the Human Population growth and its variation in the environment.

Semester	II
Credit	1
Max. Marks	CIA - 100
	TOT = 100

Unit I (4)
Multidisciplinary nature of environmental studies Definition, scope and importance, Need for public awareness. Introduction to Renewable and Nonrenewable sources – Uses of alternate energy sources.

Unit II (6)
Ecosystems - Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Food chains, food webs and ecological pyramids. Types of ecosystem - Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries). Biodiversity – Levels – Patterns – Threats – Biodiversity services.

Unit III (5)
Environmental Pollution – Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Solid waste Management : Causes, effects and control measures of urban and industrial wastes. Disaster management : floods, earthquake, cyclone and landslides.

Unit IV (6)
Social Issues and the Environment Urban problems related to energy, Water conservation, rain water harvesting and watershed management. Environmental Issues in Coimbatore District (Noyyal River, Dye Industries and Agricultural issues). Environmental ethics: Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents. Environment Protection Act - Wildlife Protection Act, Forest Conservation Act and Issues involved in enforcement of environmental legislation.

Unit V (5)
Human Population and the Environment - Population growth, variation among nations, Population explosion – Family Welfare Programme, Environment and human health, Human Rights-Women and Child Welfare, Role of Information Technology in Environment and human health.

*Activity – Documentation about Environmental Impacts/ Socio – Environmental Issues.

Total Periods: 26

COURSE OUTCOMES

- Ability to describe the principles of ecology and major concepts in environmental sciences.
- Ability to interpret the key concepts in Environmental pollution that apply to air, land and water issues on a global scale and population growth.
- Ability to investigate the polluted environment area and document the risks and formulate a design for the environmental health.
- Ability to identify the Socio - Environmental issues and apply the related analysis for the protection of environment.
- Ability to distinguish the human rights, women and child welfare in the environment.

TEXT BOOK:
1. Erach Bharucha, "Textbook for Environmental Studies for Undergraduate Courses", 2nd edition, University Grants Commission, New Delhi and Bharati Vidyapeeth Institute of Environment Education and Research, Pune, University Press, 2013.

REFERENCES:
1. M P Poonia and S C Sharma, "Environmental Studies - Concepts, Impacts, Mitigation and Management", 2nd edition, Khanna Book Publishing, 2019.
2. R Rajagopalan, "Environmental Studies", 3rd edition, Oxford University Press, 2015.
3. Shashi Chawla "A Text Book of Environmental Studies", 1st edition, Tata McGraw Hill, 2012.

Verified and Approved by Course Coordinator
Dr D Jayasheela
Associate Professor, Department of Biotechnology
Sri Ramakrishna College of Arts and Science (Autonomous),
Coimbatore – 641006.

19CMAT05 - VECTOR CALCULS AND FOURIER SERIES

Semester	III
Credit	4
Paper Type	Core
Max. Marks	CIA -30 CE -70 TOT 100

COURSE OBJECTIVE

- To introduce students to the fundamentals of vector differentiation and integration.
- To describe the basic idea of Fourier series of periodicity function and half range sine and cosine series.

UNIT- I   VECTOR DIFFERENTIATION   (10)

Limit of a vector function – Derivative of vector function – Geometrical and Physical significance of vector differentiation – Gradient – Directional derivative – Divergence and Curl operators – Solenoidal & Irrotational vectors

UNIT- II   VECTOR INTEGRATION   (11)

Vector Identities – Laplacian operator – Formula involving ∇, ∇^2 and problems – Tangential line integral – Evaluation of line integral – Conservative force field – Scalar potential – Work done by a force – Normal surface integral – Volume integral – simple problems.

UNIT - III   VECTOR INTEGRATION   (12)

Gauss divergence theorem – Verification of Gauss Divergence theorem – Evaluation of surface integral using Gauss divergence theorem - Green's theorem (statement only) – Finding the area bounded by simple closed curve 'c' using Green's theorem – Evaluation of line integral using Green's theorem – Stoke's theorem (statement only) – Evaluation of line integral using Stoke's theorem – Verification of Stoke's theorem .

UNIT- IV   FOURIER SERIES   (13)

Definition of periodic function - Fourier series – Euler's formula for Fourier coefficients – Dirichlet's conditions – Obtaining Fourier series of periodicity 2π and π for a function f(x).

UNIT –V   FOURIER SERIES   (14)

Half range sine and cosine series – Definition of half range sine series - Definition of half range cosine series – Obtaining half range Fourier sine and cosine series of periodicity π for a given function f(x) – Definition of RMS value of a function – Parseval's theorem (statement only) – Problems using Parseval's theorem.

TOTAL PERIODS: 60

COURSE OUTCOMES

After the Completion of the course student should be able to
- Know the geometrical and physical significance of Vector Differentiation and to apply them. [L1]
- Apply the Vector Integration to find the work done by a force and to find the volume of solids. [L2]
- Derive Gauss, Green's and Stoke's theorem and their verification and application in real life problems. [L3]

- Solve the Fourier series of periodicity 2π and π for a function $f(x)$. [L3]
- Explain the concept of RMS value and Parseval's theorem. [L2]

TEXT BOOKS

1. "Vector Analysis" – P. Duraipandian and Laxmi Duraipandian – Emerald Publishers 1984, Reprint 2003   (Unit I, II & III).
2. "Calculus" Volume III, - S. Narayanan and K. Manicavachagam Pillay – Vanathan Printers & Publishers Pvt. Ltd 1999 (Unit IV & V).

REFERENCE BOOKS

1. "Vector Calculus, Fourier Series and Fourier Transforms" – Dr.P.R. Vittal and V. Malini. Margham Publication 2004.
2. J.N. Sharma, A.R. Vasishtha, Vector Calculus, Krishna Prakashan Media (P) Ltd, 2004
3. M.L.Kanna , Vector Calculus, Jaiprakash Nath & Co, 2009.

Prof INFANT GABRIEL G
(Course Coordinator)

Dr JAYASHEELA D
(Academic Council -Member Secretary)

Dr UMA N
(BOS Chairperson)

Semester	III
Credit	4
Paper Type	Core
Max. Marks	CIA -30
	CE -70
	TOT=100

19MAT301 – DIFFERENTIAL EQUATIONS

COURSE OBJECTIVE

To gain knowledge about the method of solving Differential Equations and also exposes Differential Equation as a powerful tool in solving problems in Physical and Social sciences

UNIT- I (12)

Ordinary Differential Equations: Equations of First Order and of Degree Higher than one– Equations solvable for p - Equations solvable for x–Equations solvable for y- Clairaut"s Equation– Extended form of Clairaut"sEquation-Solution of Simultaneous first order ODE's

UNIT-II (13)

Second order linear Differential equations with constant coefficients- Particular Integral of the type e^{kx} - Particular Integral of the type x^k - Particular Integral of the type sinkx - Particular Integral of the type coskx .
Simultaneous Differential Equations with constant coefficients of the form
$f_1(D)x + g_1(D)y = \varphi_1(t)f_2(D)x + g_2(D)y = \varphi_2(t)$ where $f1,g1$, $f2$ and $g2$ are rational functions D = $\frac{d}{dt}$ with constant coefficient φ_1 and φ_2 explicit functions of t.-Solution using power series.

UNIT-III (12)

Second order linear Differential equations with constant coefficients – Particular integral of the type $x^n e^{ax}$ - Particular integral of the type $e^{ax}Cosbx$ - Particular integral of the type $e^{ax}Sinbx$ - Particular integral of the type xSinax - Particular integral of the type xCosax.

UNIT-IV (11)

Euler's Homogenous Linear Differential Equation – Legendre's Linear Equation – Method of variation of Parameters for Second order linear differential equation – Method of Undetermined Coefficients.

UNIT-V (12)

Total Differential Equations – Method of Solving Pdx+Qdy+Rdz=0 by taking one variable as constant – Solution by inspection – Solution of homogenous equations – Method of auxiliary equation – Non-integrable equation

COURSE OUTCOMES

After the Completion of the course student should be able to
- Solve 1st order differential equations [L2]
- Build solutions to 2nd order linear differential equations [L2]
- Recognize and solve Euler's Homogeneous Linear differential equation [L2]
- Solve problems on non-linear PDE standard type I & II [L3]
- Solve Lagrange's type PDE's. [L3]

TOTAL PERIODS: 60

TEXT BOOKS

1) Kandasamy. P, Thilagavathi.K, "Mathematics for B.Sc – Branch –I,VolumeIII", S.Chand and Company Ltd, New Delhi, 2004.
2) Dr.P.R.Vittal, "Differential Equations and Laplace Transforms" Margham Publications, Chennai   Reprint 2015.

REFERENCE BOOKS

1) S.Narayanan and T.K.Manickavasagam Pillai,Calculus, S.Viswanathan (Printers and Publishers) Pvt.Ltd, Chennai 1991.
2) N.P. Bali, Differential Equations, Laxmi Publication Ltd, New Delhi, 2004.

Prof SANTHAKUMARI R
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Secretary)

Dr UMA N
(BOS Chairperson)

19MAT302– MATHEMATICAL STATISTICS-I

Semester	III
Credit	4
Paper Type	Core
Max. Marks	CIA-30
	CE-70
	TOTAL=100

COURSE OBJECTIVE

- To teach the students about the concept of probability, one dimensional, two dimensional random variable and about special probability distribution.

UNIT – I   (12)

Random variable-Discrete and Continuous – Distribution functions-Marginal and Conditional distributions(Simple Problems)

UNIT – II   (12)

Mathematical Expectation – Moment Generating Function and Characteristic Function-Properties-Tchebychev's inequality (Simple Problems)

UNIT – III   (12)

Probability Distributions- Binomial, Poisson & Normal Distributions- Derivations, Properties and Applications – Simple Problems.
Exact Sampling distributions- t, F and x^2 Distribution (Concepts only).

UNIT – IV   (12)

Correlation and Regression – Correlation Co-efficient and Rank correlation- Regression lines and Regression Co-efficients- Properties-problems.

UNIT – V   (12)

Curve Fitting-Fitting of first degree and Second degree Parabola- Fitting of Power Curve and Exponential Curve- simple problems.
Introduction to R- Basics – Variables - Functions – Data Types – Operators – Vectors and Data Frames- Data Structures in R-Problem solving Using R –Correlation , Regression and Probability distributions.

COURSE OUTCOMES

After the completion of the course the students will be able to
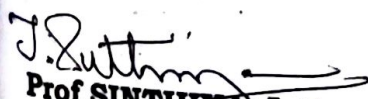
CO1: Acquire knowledge about Distribution Functions.[L1]
CO2: Demonstrate the concept of Mathematical Expectation.[L3]
CO3: Apply the concept of Probability Distribution.[L2]
CO4: Analyze data using Correlation & Regression.[L2]
CO5: Fit a polynomial for the given data.[L3]
CO6: Apply the R Programming to the Concepts learnt. [L2]
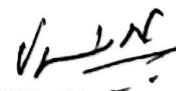
TOTAL PERIODS :60

TEXT BOOKS

1. S.C.Gupta & V.K.Kapoor: "Fundamentals of Mathematical Statistics" 1"Edition 1970, Reprint 2016.
2. Dr Mark Gardener, "Beginning R the Statistical Programming Language" John Wiley and Sons-24-May-2012.

REFERENCE BOOKS

1. P.R.Vittal: Mathematical Statistics"1"Edition 2002, Reprint 2016.
2. S.P.Gupta: "Statistical Methods"1"Edition 1969, Reprint 2017.

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(Academic Council-
Member Secretary)

Dr UMA N
(BOS Chairperson)

19MAT303 - PROGRAMMING IN C++

COURSE OBJECTIVES

Semester	III
Credit	3
Paper Type	Allied
Max.Marks	CIA:30 CE:70 TOTAL:100

- To inculcate knowledge on Object-Oriented programming concepts using C++.
- Topics include pointers, classes, overloading, data abstraction, information hiding, encapsulation, inheritance, polymorphism, file processing, templates, exceptions, container classes, and low-level language features.

UNIT–I   9

Principles of Object-Oriented Programming: Basic concepts of OOPS – **Beginning with C++:** Structure of C++ program – **Tokens, Expressions and Control Structures:** Tokens – Basic Data types – User Defined Data Types – Derived Data Types - Declaration of variables – Dynamic Initialization of Variables – Reference Variables – Operators in C++ – Scope Resolution Operator – Operator Overloading - Operator Precedence – Control Structures

UNIT–II   9

Functions in C++: The main () Function - Function Prototype – Call by Reference – Inline Functions - Default Arguments – Function Overloading - **Classes and Objects:** Specifying Class – Defining Member Functions – Private Member Functions–Arrays with in a Class- Array of Objects – Objects as Function Arguments – Friend functions

UNIT–III   9

Constructors and Destructors: Constructors - Parameterized Constructors – Multiple Constructors in a Class – Copy & Dynamic Constructors - Destructors - **Operator Overloading and Type Conversion:** Defining Operator Overloading Function –Overloading Unary Operators - Overloading Binary Operators - Overloading Operators with Friend Functions –Rules for Overloading Operators – Type Conversions

UNIT–IV   9

Inheritance, Extending Classes: Defining Derived Classes – Types of Inheritance: Single Inheritance– Multiple Inheritance – Multilevel Inheritance – Hierarchical Inheritance – Hybrid Inheritance - Virtual Base Classes – Abstract classes – Nesting of classes.

UNIT–V   9

Pointers, Virtual functions and Polymorphism: Pointers - Pointers to Objects – this Pointer – Pointers to Derived Classes – Virtual Functions – Pure Virtual Functions

Total Periods: 45

COURSE OUTCOME

Having successfully completed this course, the student will be able to:

CO1	Demonstrate fundamental programming concepts such as variables, conditional statements, looping constructs, and methods (procedures)
CO2	Describe how the class mechanism supports encapsulation and information hiding
CO3	Apply the concept of constructors, destructors and operator overloading.
CO4	Design programs for real world examples with code reusability through inheritance
CO5	Apply virtual functions in polymorphism

TEXT BOOK

1. E. Balagurusamy, " Object-Oriented Programming With C++" ,TataMcGrawHill Publishing
   Company Ltd, 2013 (UNIT I : CH 1,2,3   UNIT II :CH4,5   UNIT III:CH 6,7
   UNIT IV:CH 8   UNIT 5:CH 9)

REFERENCE BOOK

1. Ashok N Kamathene, "Object Oriented Programming With Ansi And Turbo C++" - Pearson
2. Education,2013.
3. K. R.Venugopal, Rajkumar, T.Ravishankar, "Mastering C++", Tata McGraw Hill, 2007.
4. Robert Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publications, 2006.
5. Bjarne Stroustrup, "The C++ Programming Language", Pearson Education, Fourth Edition, 2013.
6. B.Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.

E-books:

1. Bruce Eckel, Thinking in C++, 2nd Edition.
2. Herbert Schildt, C++ A Beginner"s Guide, 2nd Edition.

MOOCs:
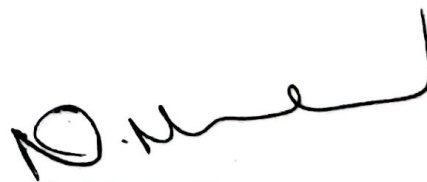
1. Introduction to Computer Programming,
   Part   1   [https://www.edx.org/course/introductioncomputer-programming-part-1-iitbombayx-cs101-1x-0]
2. C++ For C Programmers [https://www.coursera.org/course/cplusplus4c]

Prof KARUNYA N
(Course Coordinator)

Dr JAYASHEELA D
(Academic Council)

Dr MUTHUMANI N
(BOS Chairman)

19MAT304 - PROGRAMMING IN C++ LAB

Semester	III
Credit	2
Paper Type	Allied
Max. Marks:	CIA - 15
	CE - 35
	TOT =50

OBJECTIVES

- To be familiar with programming in C++ Language
- To understand various programs using decision making and looping statements
- To understand simple programs using arrays and functions
- To understand simple programs in structures, pointers

LIST OF PROGRAMS

1. Write a C++ program to find the Compound Simple interest and interest.

2. Write a C++ program to find the Maximum and Minimum of a given set of numbers

3. Write a C++ program to perform function overloading

4. Apply the concept of friend function to add data object of two different classes

5. Illustrates the use of a constructor method to initialize an object at the time of its creation.

6. Implement operator overloading concept by performing arithmetic operations on complex numbers

7. Write a C++ program to demonstrate Inheritance.

8. Write C++ programs to implement the concept of virtual base class

9. Write a C++ program using this pointer to distinguish local members from parameters.

10. Demonstrates the use of pure virtual function

TOTALPERIODS: 30

COURSE OUTCOMES

Having successfully completed this course, the student will be able to:
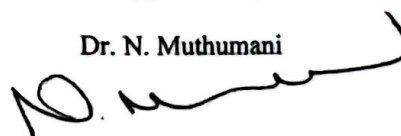
CO1	Write a programs to apply the fundamental of programming approaches and control structure
CO2	Write a programs to demonstrate the concepts of function overloading and friend function
CO3	Write a programs to use of constructor and implementing the concepts of operator overloading using binary operator.
CO4	Write a program to demonstrate inheritance and implement the concept of virtual base class.
CO5	Write a program to this pointer and demonstrates the pure virtual function

Prepared by

Karunya N

Approved by

Dr. N. Muthumani

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19CMAT06 - SKILL BASED: OPERATIONS RESEARCH-I
(Common to Mathematics and Mathematics CA)

Semester	III
Credit	3
Paper Type	Skill Based
Max. Marks	CIA -30 CE -70 TOTAL =100

COURSE OBJECTIVE:
* To enable the students to gain knowledge about Operation Research and better planning techniques.

UNIT- I
(8)

Introduction to OR – Meaning and scope - OR and Decision Making - LPP – Formulation – Graphical solution – Simplex method – Big M Method.

UNIT –II
(10)

Transportation problem – IBFS – NWC, LCM, VAM Optimum solutions- MODI Method- Unbalanced Transportation Problem. The Assignment Problems-Hungarian Algorithm-Unbalanced Assignment - Impossible Assignment.

UNIT- III
(9)

Network scheduling by PERT/ CPM: Introduction- network basic components-Rules of network construction- Time calculation in networks-CPM, PERT probability factor-PERT calculations.

UNIT-IV
(9)

Replacement Problems: Introduction-Replacement of equipment/ assets that deteriorate gradually-Replacement of items that fail suddenly.

UNIT-V
(9)

Introduction: Problems of sequencing- basic terms used in sequencing –processing n-jobs through 2 machines-processing n-jobs through k-m machines-processing 2 jobs through k machines.

TOTAL PERIODS: 45

COURSE OUTCOMES:

After the Completion of the course the student should be able to
CO1: Formulate and solve Linear Programming Problems [L3]
CO2: Solve the Transportation and Assignment Problems. [L3]
CO3: Construct the Network for a project to study the system and take better decision. [L2]
CO4: Solve Replacement problems and find the optimal replacement period. [L2]
CO5: Solve sequencing problems and plan accordingly. [L3]

TEXT BOOK:

1. Kanti Swarup, P. K. Gupta Man Mohan ," Operations Research" , Sultan Chand & Sons, New Delhi. (17th Edition)

REFERENCE BOOKS:

1. Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan," Resource Management Techniques" A.R.Publications.
2. J.K.Sharma , "Operations Research – Theory & Applications" 5th Edition Macmillan.

Dr HANNAH REVATHY F
(Course Coordinator)

Dr JAYASHEELA D
(Academic Council -Member Secretary)

Dr UMA N
(BOS Chairperson)

PERSONALITY APTITUDE AND CAREER ENHANCEMENT (PACE-III)

Subject Code: 19CPE03

Common to all the UG streams admitted from AY 2019-20 Onwards

Semester	III
Credit	1
Paper type	Skill based
Max. Marks	Total=100 (Online:50+Verbal Oral: 50)

Instruction Hours per Semester: 40

Aim:

To educate and enrich the students on quantitative ability, reasoning ability, and verbal ability. Equip the students on group behavior and team building skills.

Course Objectives

To enable students to,

- Improve their quantitative ability.
- Improve the ability of arithmetic reasoning
- Enhance their verbal ability through vocabulary building and grammar
- Enhance their linguistic ability.
- Manage emotions through intelligence

Unit I

Quantitative Ability – I

Sequence and Series, Profit And Loss, Time, Speed, Distance, Averages, Percentages,

Problems on HCF and LCM, Problems on Ages, Simple Interest & Compound Interest,

Unit II

Reasoning Ability – I

Syllogism, Blood Relations, Puzzles, Analogies, Logical Order, Seating Arrangements,

Statement and Conclusions, Most Logical Choice, Inferred Meaning, Data Arrangements,

Unit III

Verbal Ability – I

Vocabulary – Etymology, Root words, Verbal Analogy. Workshop on Reading – Sub-skills

of Reading, Techniques of Reading, Jumbled Paragraphs and Jumbled Essays. Application of

Grammar concepts – Sentence Construction

Unit IV

Linguistic Ability

Writing & Speaking Skills – Parts of Speech, Modal Verbs, Tenses, Active and Passive Voice, Degrees, Articles, Contextual usage of words – Conversational English

Unit V

Emotional Intelligence

Time Management – Conflict Resolution – Stress & Anger Management – Online presence & researching online – Mind maps – Negotiation & Persuasion – Level 1 & 2 Interview Questions

Course Outcomes

On the successful completion of the course, the student would be able to-

- Enhance their ability to deal with quantities
- Understand and improve arithmetic reasoning.
- Build better vocabulary and grammar
- Speak and write better language.
- Resolve Conflicts, Manage emotions like anger and stress.

References

1. Quantitative Aptitude for Competitive Exams by R. S.Agarwal
2. Quantum CAT by Sarvesh Verma
3. A Modern Approach to Logical Reasoning by R. S.Agarwal
4. Verbal Ability and Reading Comprehension by Arunsharma
5. Word Power Made Easy by Norman Lewis
6. High School English Grammar by Wren and Martin
7. English Conversation Practice by Grant Taylor
8. Group Discussion and Interviews by Anand Ganguly
9. Art of Social Media by Guy Kawasaki

Prepared & Verified
Course Coordinator

Approved by
Academic Council Member Secretary

17

19MAT401- FOURIER AND LAPLACE TRANSFORMS

Semester	IV
Credit	4
Paper Type	Core
Max. Marks	CIA -30
	CE -70
	TOTAL =100

COURSE OBJECTIVE

To enable students to learn about Fourier Transforms, solve boundary values problems and to provide the methods of Laplace, inverse Laplace transforms and its Applications.

UNIT I
(13)

Fourier Transform – Dirichlet's Conditions - Fourier Integral formula (without proof) - Fourier Transform- Inverse theorem for Fourier Transform- Fourier Sine and Cosine Transforms and their inversions - Linearity property of Fourier Transforms - Change of scale property - Shifting theorem - Modulation Theorem - Fourier transform of derivatives - Relation between Fourier Transform and Laplace Transform - Convolution theorem of Fourier Transforms - Parseval's Identity.(Simple problems)

UNIT II
(13)

Fourier Transforms - Fourier Sine Transforms- Inversion formula for Sine Transform - Fourier Cosine Transform- Inversion formula for Cosine Transforms - Simple problems.

UNIT III
(13)

Laplace Transforms: Definition – Laplace Transforms of elementary functions – Linearity property – First and Second Shifting Theorem – Change of scale property – Laplace Transforms of Derivatives – Laplace Transform of Integrals – Simple problems.

UNIT IV
(11)

Inverse Laplace Transforms – Definition – Linearity property – First and Second Shifting Theorem – Change of scale property – Inverse Laplace Transform for Partial Fractions - Convolution Theorem - Simple problems.

UNIT V
(10)

Solution of Linear Ordinary Differential Equations of second order – Solution of First Order Simultaneous equations with constant coefficient using Laplace Transform – Simple problems.

COURSE OUTCOMES

After the Completion of the course student should be able to

CO1: Analyse Fourier Transforms of time domain functions (L3)

CO2: Find Fourier Cosine and Sine Transforms for the given function (L2)

CO3: Analyse the properties of Laplace Transform (L3)

CO4: Find Inverse Laplace Transforms for the given frequency domain function (L2)

CO5: Find the solution of ordinary differential equations using Laplace transforms (L2)
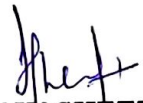
TOTAL PERIODS : 60

TEXT BOOKS

1. Dr. P. R. Vittal "Differential Equations, Fourier and Laplace Transforms" Margham Publications, Chennai Reprint 2016.

REFERENCE BOOKS

1. Dr. J. K. Goyal and K.P. Gupta, " Laplace and Fourier Transforms", PragaliPrakashan Publishers, Meerut, 2000
2. Kandasamy. P, Thilagavathi. K, "Mathematics for B.Sc – Branch – I Volume III", S. Chand
   and Company Ltd, New Delhi, 2004.
3. A.R. Vasistha and Dr. R.K. Gupta ,"Integral Transforms" , Krishna Prakashan Media Pvt Ltd. Meerut.
4. Dr. M.K. Venkataraman, "Engineering Mathematics Vol. II" National publishing Company 4th   edition 2003.

Prof VASANTH KUMAR BONIFACE
(Course Coordinator)

Dr JAYASHEELA D
(Academic Council -Member Secretary)

Dr UMA N
(BOS Chairperson)

19MAT402 – STATISTICAL INFERENCE

Semester	IV
Credit	4
Paper Type	CORE
Max. Marks	CIA -30
	CE -70
	TOTAL =100

COURSE OBJECTIVE:
To teach the students about the basic knowledge of Probability and Statistical Inference, Theory of Estimation and Testing of hypothesis.

UNIT – I (13)

Revision of Probability, Different Discrete and Continuous Distributions. Functions of Random Variables and their distributions, T, Chi-sq, F distributions and their Moments.

UNIT – II (10)

Introduction of statistics and the distinction between Data and its properties, and probabilistic models.

UNIT – III (13)

Estimator and methods of estimation, Properties of an estimator: Consistency, Unbiasedness, Efficiency and Sufficiency. Neyman Factorization, Cramer-Rao Bound.

UNIT – IV (11)

Confidence Intervals, Concepts of hypothesis testing, Characteristics of Good Hypothesis, null and Alternative Hypotheses, Types of Errors.

UNIT – V (13)

Inference on Population mean, Comparing two population means, Inference on Variance, Comparing two population variance. Neyman Pearson Lemma.

TOTAL PERIODS :60

COURSE OUTCOMES

After the completion of the course the students will be able to

CO1   Apply the concepts of probability distributions(L2)
CO2   Acquire knowledge about probabilistic models(L1)
CO3   Explain the basic concepts of MLE & Moments(L1)
CO4   Analyze data using hypothesis testing (L3)
CO5   Analyze data using large and small sample test (L3)

TEXT BOOK
1. Probability and Statistics for engineers and scientists, Ed 4, Anthony J Hayter, Brroks/Cole, Cengage Learning.
2. Statistical Methods, R.J.Freund, W.J. Wilson and D.L Mohr, (Ed 3) Elsevier.
3. Mathematical Statistics: A Textbook, S. Biswas and G.L.Sriwastav, Narosa

Note : The Assessment of the NPTEL (SWAYAM Portal) will be incorporated as per our Regulations.

Dr RAMYA K
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Dr JAYASHEELA D
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Dr UMA N
(BOS Chairperson)

19MAT402 – STATISTICAL INFERENCE

Semester	II
Credit	4
Paper Type	CORE
Max. Marks	CIA -30 CE -70 TOTAL =100

COURSE OBJECTIVE:

To teach the students about the basic knowledge of Probability and Statistical Inference, Theory of Estimation and Testing of hypothesis.

Week 1 : Revision of Probability, Different Discrete and Continuous Distributions

Week 2 : Functions of Random Variables and their distributions, T, Chi-sq, F distributions and their Moments

Week 3 : Introduction of statistics and the distinction between Data and its properties, and probabilistic models

Week 4 : Estimator and methods of estimation, Properties of an estimator: Consistency, Unbiasedness, Efficiency and Sufficiency

Week 5 : Neyman Factorization, Cramer-Rao Bound

Week 6 : Confidence Intervals, Concepts of hypothesis testing, Characteristics of Good Hypothesis, null and Alternative Hypotheses, Types of Errors

Week 7 : Inference on Population mean, Comparing two population means, Inference on Variance, Comparing two population variance

Week 8 : Neyman Pearson Lemma

COURSE OUTCOMES

After the completion of the course the students will be able to

CO1   Apply the concepts of probability distributions (L2)
CO2   Demonstrate the concept of Random variables (L2)
CO3   Explain the basic concepts of MLE & Moments (L1)
CO4   Analyze data using hypothesis testing (L3)

TEXT BOOK

1. Probability and Statistics for engineers and scientists, Ed 4, Anthony J Hayter, Brroks/Cole, Cengage Learning.
2. Statistical Methods, R.J.Freund, W.J. Wilson and D.L Mohr, (Ed 3) Elsevier.
3. Mathematical Statistics: A Textbook, S. Biswas and G.L.Sriwastav, Narosa

Note : The Assessment of the NPTEL (SWAYAM Portal) will be incorporated as per our Regulations.

Dr RAMYA K
(Course Coordinator)

Dr JAYASHEELA D
(Academic Council -Member Secretary)

Dr UMA N
(BOS Chairperson)

19MAT403 - STATICS

COURSE OBJECTIVE

To enable the students to gain knowledge about a system of forces acting on a particle and on a body in order to maintain equilibrium.

Semester	1V
Credit	4
Paper Type	Core
Max. Marks	CIA - 30
	CE - 70
	TOTAL=100

UNIT -I   (13)

Forces acting at a point: Resultant and Component - Analytical expressions-Parallelogram of Forces - - Triangle of Forces-Perpendicular triangle of forces and its converse-Polygon of forces-Lamis theorem - (λ- μ) theorem- Resolution and components of forces-Theorem on resolved parts-Resultant of any number of forces (Analytical and graphical methods).

UNIT-II   (13)

Parallel forces: Resultant of two like and unlike parallel forces- condition of equilibrium of three coplanar parallel forces-moment of a force-geometrical representation-Varignon's theorem- generalized theorems-Couples: Definition-Equilibrium of two couples-Equivalence of two couples-Couples in parallel planes-Resultant of coplanar couples-Resultant of a couple and a force.

UNIT-III   (12)

Forces acting on a rigid body: Three forces acting on a rigid body: Rigid body subjected to any three forces-Three coplanar forces-Two triangle theorems (statements only)-Coplanar forces: Reduction of any number of coplanar forces- Analytical representation- Conditions for a system of forces to be reduced to a single force.

UNI-IV   (12)

Friction: Introduction- Statical, Dynamical and limiting friction - Coefficient of friction- Angle of friction-Cone of friction-Equilibrium of a particle on a rough inclined plane.
Centre of gravity: Introduction-Determination of centre of gravity in simple cases

UNIT-V   (10)

Equilibrium of Strings: Definition-Equation of common catenary- Tension at any point.

TOTAL PERIODS: 60

COURSE OUTCOMES

After completion of the course the students will be able to

CO1: Explain the basic concepts of components and resultant of a system of forces on a particle. (L1)

CO2: Determine moment and resultant of a system of coplanar couples. (L2)

CO3: Reduce a system of forces on a body to a single force through analytical representation. (L3)

CO4: Analyze the equilibrium of a particle on a rough inclined plane and determine the center of gravity. (L3)

CO5: Derive the equation of a common catenary. (L2)

TEXT BOOK

1. M.K.Venkataraman, Statics, Agasthiar Publications, Trichy, 1999.
   Unit I-Chapter 2: Sections 1, 3 to 15
   Unit II-Chapter 3: Sections 2, 3, 5, 7, 9, 12, 13 & Chapter 4: Sections 1 to 4, 6 and 7
   Unit III- Chapter 5: Sections 1, 2 and 5 & Chapter 6: Sections 2 to 7
   Unit IV- Chapter 7: Sections 3, 5 to 8, 10; Chapter 8: Sections 1-10
   Unit V-Chapter 11: Sections 1, 2 and 4

REFERENCE BOOKS

1. P.Duraipandian and LaxmiDuraipandian, Mechanics , S.Chand and Company Ltd, Ram Nagar, New Delhi -55, 1985.
2. Herbert Goldstein, Charles P.Poole, John SafkoClassical Mechanics, Pearson, 3rd Edition.
3. Upadhyaya J.C., Classical Mechanics, Himalaya Publishing house, 2017.

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Dr UMA N
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19CMATE01 - DISCRETE MATHEMATICS
(Common to Mathematics & Mathematics (CA))

Semester	IV
Credit	4
Paper Type	Elective
Max. Marks	CIA -30
	CE -70
	TOTAL=100

COURSE OBJECTIVE

To enable the students to learn and visualize the fundamental ideas about Mathematical logic, Formal languages, Automata, Boolean algebra and Lattices.

UNIT –I MATHEMATICAL LOGIC

Connectives, Well-Formed Formula Tautology, Equivalence of formula, **(12)** Tautological implications, Duality law, Normal forms, Theory of inference Predicates, Variables & Quatifiers.

UNIT- II RELATIONS AND FUNCTIONS

RELATIONS: Properties – Equivalence relation and Partial order relation – Poset – **(10)** Graphs of relations – Hasse diagram – Matrices of relations – Closure operations on relations – Partition & Covering of a set – Compatibility relations- Composition of binary relations

FUNCTIONS: Definition & Introduction – Composition of Functions – Inverse function – Binary and n-array operations – Characteristic function of a set - Hashing functions.

UNIT –III LANGUAGES AND AUTOMATA THEORY

Language, Grammar – Definition and Types. Deterministic finite state **(12)** automata, Non- Deterministic finite state automata – Conversation of Non- Deterministic automata to deterministic automata – Procedure and Problems.

UNIT -IV LATTICES

Lattices as partially ordered sets: Definitions & Examples – Some properties of **(10)** lattices – Lattices as algebraic systems – Sub lattices – Direct product & homomorphism.

UNIT -V BOOLEAN ALGEBRA

Definition and Examples – Sub algebra, Direct Product and homomorphisms – **(11)** Boolean polynomials - Karnaugh map (k-map for 5 & 6 variables are not included)

COURSE OUTCOMES

Upon successful completion of the course, students will able to

CO1: Solve Mathematical Logic problems. (L2)
CO2: Visualize and apply the fundamental ideas of relations and functions. (L3)
CO3: Describe the different types of Formal languages and Automata theory (L2)
CO4: Analyze the properties of Lattices. (L3)
CO5: Simplify the Boolean expressions. (L2)

TOTAL PERIODS: 55

TEXTBOOK

1.J.K. Sharma, 'Discrete Mathematics', Macmillan Publishers India Ltd, 3Rd edition 2011

REFERENCE BOOKS

1. J.P. Trembly and R.P. Manohar, 'Discrete Mathematical Structures with Application to Computers', Tata MC Graw Hill Publications 1997

2.Dr.M.K. Venkataraman, Dr.N. Sridharan, N.Chandrasekaran, 'Discrete Mathematics' National Publishing Company, 1st edition 2000, Reprint 2012.

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19MAT404 - PROGRAMMING IN JAVA

COURSE OBJECTIVE

Semester	IV
Credit	3
Paper Type	Allied
Max. Marks	CIA - 30 CE - 70 TOTAL =100

- To gain knowledge about basic Java language syntax and semantics.
- To understand the basic concepts such as Tokens, variables, data types, operators and expressions.
- To understand simple programs using decision making and looping statements.
- To gain knowledge about interfaces, packages, Multithreaded Programming.
- To understand how to implement Applet programs and Exceptions.

UNIT-I (9)
Fundamentals of Object Oriented Programming: Basic Concepts of Oops - **Java Evolution:** Java History – Java features – Java environment – **Overview of Java Language:** Java Tokens **Constants, Variables and Data Types:** Constants – Variables – Data Types - **Operators and Expressions**

UNIT II (9)
Decision making and Branching - Decision making and Looping – Classes, Objects and Methods : Defining a class – Adding variables and method – Creating objects – Accessing class members – Constructors – Method overloading –Inheritance – Method overriding – Visibility control.

UNIT III (9)
Interface: Defining interface – Extending interface – Implementing interface – Accessing interface variable - **Packages:** Java API packages – Using system package – Naming conventions – Creating packages – Using a package.

UNIT IV (9)
Multithreaded programming: Creating threads – Extending the thread class – Stopping and blocking thread – Life cycle of a thread – Thread methods –Implementing the Runnable interface

UNIT V (9)
Applet Programming: Introduction – Applet code – Applet life cycle – Applet Tag – Web page designing – Running the applet – More about applet tag – Passing parameters to Applets - **Managing I/O Files:** Streams – Stream classes – Byte streams – Character streams – Using stream – I/O classes and file class.

TOTAL PERIODS: 45

Course Outcomes (CO):
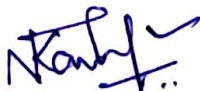Having successfully completed this course, the student will be able to:

CO1	Define Basic programming concepts in java	L2
CO2	Implement basic Oops concepts in java	L3
CO3	Apply packages and interfaces in java.	L3
CO4	Demonstrate the concept of Multithreaded Programming	L3
CO5	Demonstrate Applet and describe I/O streams in java.	L3

TEXT BOOKS

1. E.Balagurusamy, Programming with JAVA A Primer, Fourth Edition, Mc Graw Hill, 2011

REFERENCE BOOKS

1. Java™: The Complete Reference. Nineth Edition Herbert Schildt., Mc Graw Hill, 2014.

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Dr Uma N
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19MAT405 – PROGRAMMING IN JAVA LAB

COURSE OBJECTIVE

- To learn the main features of the Java language.
- To understand how to debug and test Java programs
- To gain knowledge to implement interface, inheritance and applet concepts using java.
- To understand the importance of java in real life applications

Semester	IV
Credit	2
Paper Type	Allied Practical
Max. Marks	CIA -15 CE -35 TOTAL =50

LIST OF EXPERIMENTS

1. Write a program to find the greatest of three numbers.
2. Write a program using arithmetic, relational and logical operators.
3. Write a program to find the factorial of a number entered by user using while loop.
4. Write a program to perform Method Overloading.
5. Write a program to demonstrate Inheritance.
6. Write a program to create a Java Package.
7. Write a program to prepare pay slip using Interfaces concept
8. Write a program to explain the multithreading with the use of multiplication tables. Three threads must be defined, with each creating one multiplication table
9. Write a program to display all shapes with available built in functions using applets.
10. Write a program to drawing a human face using applet.

TOTAL PERIODS: 30

COURSE OUTCOMES

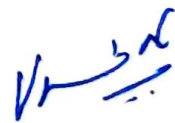Having successfully completed this course, the student will be able to:

CO1	Write a programs to apply the fundamental of programming approaches	L3
CO2	Write a programs to demonstrate the concepts of looping and method overloading	L3
CO3	Write a programs to demonstrate inheritance and illustrate the concepts of packages	L3
CO4	Write a program to apply the concept of interface to prepare employee payslip and thread for creating a multiplication table.	L3
CO5	Write a program to Illustrate the concept of functions using applets	L2

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Dr Uma N
BoS Chairperson

19CMAT07 - SKILL BASED : OPERATIONS RESEARCH- II
(COMMON TO MATHEMATICS& MATHEMATICS (CA))

Semester	IV
Credit	3
Paper Type	Skill Based
Max. Marks	CIA:30 CE:70 TOTAL :100

COURSE OBJECTIVE

To enable the Students to gain knowledge about the techniques of Decision Making using various models of Operations Research.

UNIT –I
Game Theory- Two persons Zero sum game- Pay off matrix- Saddle point- Pure and Mixed Strategies- Dominance Property- (2xn) and (mx2) Graphical method- Problems. **(7)**

UNIT- II
Decision analysis- Decision Making Environment- Decision under uncertainty Pessimistic, Optimistic, Laplace and Hurwicz Principle- Decision under Risk- EPPI- Decision Trees. **(9)**

UNIT –III
Queueing Theory -Introduction-Characteristics of queueing systems - Classification of queueing problems in (M/M/1): (∞/FIFO); (M/M/1): (N/FIFO); (M/M/C): (∞/FIFO); (M/M/C): (N/FIFO); **(11)**

UNIT -IV
Inventory Control- Introduction- Inventory Costs- EOQ Problem with and without shortages- Production Problems with and without shortages- EOQ with Price Breaks. **(9)**

UNIT –V
Simulation- Introduction- Types of Simulation- Event Type Simulation- Generation of Random Numbers-Monte Carlo Simulation. Application to inventory and Queueing systems. **(9)**

COURSE OUTCOMES
After the Completion of the course student should be able to

CO1   Solve game theory problems. (L2)
CO2   Formulate and solve Decision Problems. (L3)
CO3   Apply the concepts of Queuing systems to take optimal decisions. (L2)
CO4   Solve Inventory Problems. (L2)
CO5   Simulate and predict the future occurrences to study the system in detail. (L3)

TOTAL PERIODS : 45

TEXT BOOK

1. Kanti Swarup, P.K.Gupta Man Mohan , "Operations Research", Sultan Chand & Sons, NewDelhi, 1977 (17th Edition)

REFERENCE BOOKS
1. Prof.V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan, "Resource Management Techniques", A.R.Publications, 2015.
2. J.K.Sharma ,"Operations Research – Theory & Applications", 5th Edition, Macmillan, 2016.

Dr HANNAH REVATHY F
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Dr JAYASHEELA D
(Academic Council-Member Secretary)

Dr UMA N
(BOS Chairperson)

PERSONALITY APTITUDE AND CAREER ENHANCEMENT (PACE-IV)
Subject Code: 19CPE04
Common to all the UG streams admitted from AY 2019-20 Onwards

Semester	IV
Credit	2
Paper type	Skill based
Max. Marks	Total=100 (Online:50+Verbal Oral: 50)

Instruction Hours per Semester: 40

Aim

To educate and enrich the students on quantitative ability, reasoning ability and verbal ability. Equip the students on group discussion and interview skills.

Course Objectives

To enable students to,

- Improve their quantitative ability.
- Improve their reasoning ability.
- Enhance their verbal ability through vocabulary building and grammar
- Equip with creative thinking, problem solving and leadership skills
- Build resumes, speak in public, and attend interviews better.

Unit - 1

Quantitative Ability – II

Ratios & Proportions, Clocks & Calendars, Partnerships, Pipes and Cisterns, Surds & Indices, Problems on Trains, Height and Distance, Races and Games

Unit – 2

Reasoning Ability – II

Mathematical Operations, Cubes & Cuboids, Passage and Inference, Venn Diagrams, Flowchart & Logical Gates

Unit-3

Verbal Ability – II

Synonyms, Sentence Completion, Antonyms, Selecting Words, Spotting Errors, Sentence Correction, Reading Comprehension, Jumbled Sentences, Theme Detection, Sentence Selection

Unit 4
Group Discussion Skills

Creative Thinking – Problem Solving – Dealing with criticism – Leadership skills – Team Playing skills – Presentation skills – Spontaneity – Empathy – Perseverance – Decision Making

Unit – 5
Interview Skills

Resume Writing Techniques – Types of Resume – Understanding Key Words – JD Mapping. Interview Techniques – Reiteration of SWOT and Goal Setting – Level 3 Interview Questions – Importance of Grooming and Non-verbal Communication
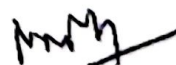
Course Outcomes

On the successful completion of the course, the student would be able to-

- Enhance their ability to deal with quantities
- Understand and improve arithmetic reasoning.
- Build better vocabulary and grammar
- Enhance their creative thinking, problem solving and leadership skills
- Prepare resumes, speak in public and attend interviews better.

References

1. Quantitative Aptitude for Competitive Exams by R. S. Agarwal
2. Quantum CAT by Sarvesh Verma
3. A Modern Approach to Logical Reasoning by R. S. Agarwal
4. Verbal Ability and Reading Comprehension by Arun sharma
5. Word Power Made Easy by Norman Lewis
6. High School English Grammar by Wren and Martin
7. English Conversation Practice by Grant Taylor
8. Group Discussion and Interviews by Anand Ganguly
9. Art of Social Media by Guy Kawasaki

Verified by
Course Coordinator

19MAT501 – REAL ANALYSIS - I

COURSE OBJECTIVE

To train the students on real and complex numbers, sets and metric space.

Semester	V
Credit	4
Paper Type	Core
Max. Marks	CIA -30 CE -70 TOTAL- 100

UNIT I   13 Hours

The Real and Complex number systems the field axioms, the order axioms – integers –the uniqueFactorization theorem for integers –Rational numbers –Irrational numbers –Upper bounds,maximum Elements, least upper bound –the completeness axiom –some properties of the supremum –properties of the integers deduced from the completeness axiom- The Archimedian property of the real number system – Rational numbers with finite decimalrepresentation of realnumbers –absolute values and the triangle inequality – the Cauchy - Schewarz, inequality –plus and minus infinity and the extended real number system.

UNIT II   12 Hours

Basic notions of a set theory. Notations –ordered pairs –Cartesian product of two sets –Relations and functions – further terminology concerning functions –one – one functions andinverse –composite functions –sequences –similar sets-finite and infinite sets –countable and uncountable sets –un countability of the real number system –set algebra –countable collection ofcountable sets.

UNIT III   12 Hours

Elements of point set topology: Euclidean space Rn –open balls and open sets in Rn. Thestructure of open Sets in Rn –closed sets and adherent points –The Bolzano –Weierstrass theorem–the Cantor intersection Theorem.

UNIT IV   11 Hours

Covering –Lindelof covering theorem –the Heine Borel covering theorem – Compactnessin Rn –Metric Spaces –point set topology in metric spaces –compact subsets of a metric space –Boundary of a set.

UNIT V   12 Hours

Convergent sequences in a metric space – Cauchy sequences – Completeness sequences – complete metric Spaces. Limit of a function –Continuous functions – continuity of compositefunctions. Continuous complex valued and vector valued functions.

TOTAL PERIODS: 60 Hours

COURSE OUTCOMES

After the completion of the course the students will be able to

- Describe fundamental properties of the real numbers that lead to the formal development of real analysis.[L1]
- Illustrate the concepts of countable and uncountable sets.[L2]
- Apply Bolzano –Weirstrass theorem and Cantor intersection Theorem.[L2]
- Explain the concept of basic topological properties of the real numbers.[L3]
- Analyze the properties of continuous functions.[L3]

TEXT BOOK

1. T.M.Apostol ,"Mathematical Analysis", Narosa Publishing Company, Second Edition,2002.

REFERENCE BOOK

1. Walter Rudin,"Principles Of Mathematical Analysis", McGraw Hill, Edition three , 2007.

Prepared by	**Verified by**	**Approved by**
VIVEK E	INFANT GABRIEL G	Dr UMA N
(Course Coordinator)	(Syllabus Coordinator)	(BOS Chairperson)

Dr HARI PRASAD D
(Academic Council -Member Secretary)

19MAT502 - COMPLEX ANALYSIS - I

COURSE OBJECTIVE

To enable the students to gain knowledge about complex functions, differentiability and analyticity of complex functions, mappings and complex integration.

Semester	V
Credit	4
Paper Type	Core
Max. Marks	CIA –30 CE-70 TOTAL-100

UNIT- I COMPLEX NUMBER SYSTEM AND COMPLEX PLANE   11 Hours

Absolute value of a complex number –Argument- Inequalities in terms of moduli -Relevant examples-Definition of extended complex plane -Stereographic projection. Elementary transformation. i) $w = z + b$ ii) $w = az$ iii) $w = 1/z$.

UNIT - II ANALYTIC FUNCTIONS AND BILINEAR TRANSFORMATION   12 Hours

Limit of a function- Continuity of a function -Differentiability and Analyticity of a function-Necessary conditions for differentiability -Sufficient conditions for differentiability - Cauchy-Riemann equations in polar coordinates. Bilinear Transformation definition-simple problems.

UNIT - III POWER SERIES AND ELEMENTARY FUNCTIONS   12 Hours

Sequence and series-power series- Absolute convergence of a Power Series-Circle of convergence -Analyticity of the sum of power series in the Circle of convergence (term by term differentiation of a series)- Exponential- Trigonometric-Hyperbolic functions.

UNIT - IV HARMONIC FUNCTIONS   13 Hours

Conjugate Harmonic functions- Definition and determination. Conformal Mapping: Conformal mapping definition-Mapping $w \to f(z)$, where f is analytic, particularly the mappings $w = e^z$, $w = \sin z$, $w = \cos z$, $w = 1/2(z + 1/z)$.

UNIT - V COMPLEX INTEGRATION   12 Hours

Simple rectifiable oriented curves- Integration of complex functions-Definite integral -Simply connected region - Proof of Cauchy's Theorem (using Goursat's lemma for a simply connected region). Cauchy's integral formula.

TOTAL PERIODS: 60 Hours

COURSE OUTCOME

After the completion of the course the students will be able to
- Find the absolute value, argument of complex numbers and transform the functions in complex plane.[L2]
- Determine the analyticity and differentiability of complex functions. [L3]
- Analyze the convergence of power series. [L2]
- Determine the harmonic function and map the functions in complex plane. [L3]
- Evaluate the integral of complex functions.[L3]

TEXT BOOK

1. S. Arumugam, A. Thangapandi Isaac and A. Somasundarsm, "Complex Analysis", Scitech publications, Chennai-600 045, 2018.

REFERENCE BOOKS

1. P. Duraipandian, LaxmiDuraipandian and D. Muhilan, "Complex analysis", Emerald Publishers, Chennai 2, 1997
2. L.V Ahlfors, "Complex Analysis", Third edition, McGraw Hill, New York., 1979.

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19MAT503 – ABSTRACT ALGEBRA

Semester	V
Credit	4
Paper Type	Core
Max. Marks	CIA - 30 CE - 70 TOTAL=100

COURSE OBJECTIVES

- Learn the elementary concepts and basic ideas involved in Groups, Subgroups, Cyclic groups, Homomorphism and Isomorphism.
- Understand the fundamental concepts of Ring Theory which include Ideals, Quotient Rings, Euclidean Rings

UNIT- I   GROUPS   12 Hours

Groups - Abelian group - Symmetric group - Subgroups – Cyclic subgroup - Definitions and Examples- Basic Properties- Some preliminary lemmas.

UNIT- II   NORMAL SUBGROUPS   12 Hours

Index of a group – Order of an element –Cosets and Lagrange's theorem - Fermat theorem – A Counting Principle – Normal Subgroups and Quotient Groups.

UNIT- III HOMOMORPHISMS   12 Hours

Homomorphisms(Application 1 and 2 are omitted) – Automorphisms – Inner Automorphism – Cayley's, theorem, Permutation Groups.

UNIT- IV RINGS   12 Hours

Rings – Definition and Examples – Some special classes of Rings – Commutative Ring – Field – Integral Domain – Homomorphisms of Rings - Ideals and Quotient Rings.

UNIT- V MORE IDEALS AND QUOTIENT RINGS   12 Hours

Maximal and Prime Ideals – The Field of Quotients of an Integral Domain- Euclidean Rings – A Particular Euclidean Ring.

TOTAL PERIODS: 60 Hours

COURSE OUTCOMES

After the completion of the Course, the student will be able to

CO1 : Enumerate the basic concepts of Groups, Subgroups and Cyclic groups [L2]

CO2 : Describe the Normal Subgroups and Quotient Groups. [L2]

CO3 : Illustrate the concepts of Homomorphism, Isomorphism and Automorphisms. [L3]

CO4 : Explain the concept of Rings and Homomorphism on Rings.[L1]

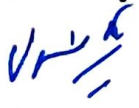CO5 : Analyze the characteristics of Euclidean Rings and Particular Euclidean Rings [L2]

TEXT BOOK

1. I. N. Herstein, "Topics in algebra", John Wiley & Sons, New York, Second Edition, 2010.

REFERENCE BOOKS

1. Dr. S. Arumugam and A. ThangapandiIssac, "Modern Algebra", Scitech Publication, 2007.

2. A.R.Vasishtha, "Modern Algebra", Krishna PrakashanMandir, Meerut, 1994-95.

Prepared by	Verified by	Approved by
Dr UMA N (Course Coordinator)	INFANT GABRIEL G (Syllabus Coordinator)	Dr UMA N (BOS Chairperson)

Dr HARI PRASAD D
(Academic Council - Member Secretary)

19MAT604 - DYNAMICS

COURSE OBJECTIVE

To equip the students with fundamental knowledge about motion in a straight line, projectile motion, simple harmonic motion and central orbits.

Semester	V
Credit	4
Paper Type	Core
Max. Marks	CIA -30 CE -70 TOTAL- 100

UNIT I   12 Hours

Motion in a straight line: Equations of motion - Acceleration of falling bodies -Vertical motion under gravity-Motion down a smooth inclined plane.

Laws of motion: Newton's laws of motion-Newton's law of gravitation-Conservation of Linear momentum-Work done in an elastic string – Work done by a couple.

UNIT II   11 Hours
Projectile motion:

Introduction - Definitions-path of a projectile - Characteristics of the motion of the projectile- Proving that the path is a parabola- Finding the velocity of the projectile in magnitude and direction at the end of time t.

UNIT III   13 Hours
Collision of objects:

Introduction-Fundamental laws of Impact – Newton's experimental law-Impact of a smooth sphere on a fixed smooth plane- Direct impact of two smooth spheres- Loss of kinetic energy due to direct impact of two smooth spheres - Oblique impact of two smooth spheres.

UNIT IV   13 Hours
Simple Harmonic Motion:

Introduction- Simple harmonic motion in a straight line - General solution of the SHM equation- Composition of two simple harmonic motions of the same period and in the same straight line- Composition of two simple harmonic motions of the same period in two perpendicular directions.

UNIT V   11 Hours
Central Orbits and Moment of Inertia:

Radial and transverse component of velocity and acceleration- Differential equation of central orbits -Velocities in a central orbit-Two fold problem in central orbits- Apses and apsidal distances-Moment of Inertia-Definition-Parallel axis theorem- Perpendicular axis theorem-Moments of inertia in some particular cases.

TOTAL PERIODS: 60 Hours

COURSE OUTCOMES

After the completion of the course the students will be able to

- Derive the equations of motion and apply them. (L2)
- Analyze Projectile and its Characteristics.(L3)
- Illustrate the fundamental laws of impact and its applications. (L2)
- Analyze the solution of a simple harmonic motion equation.(L3)
- Apply the principles of Central Orbits and moment of inertia. (L2)

TEXT BOOK

1. M.K.Venkataraman, Dynamics, 11th Ed. Agasthiar Publications, Trichy.

Unit I- Chapter3: Sections 3.29 to 3.32 & Chapter 4: Sections 4.1 to 4.8,
            4.11, 4.17, 4.18, 4.24, 4.26 to 4.28, 4.30 to 4.35
Unit II- Chapter 6: Sections 6.1, 6.2, 6.3 to 6.9
Unit III- Chapter 8: Sections 8.1 to 8.9
Unit IV- Chapter 10: Sections 10.1 to 10.3, 10.5 to 10.7
Unit V- Chapter 11: Sections 11.2, 11.6, 11.10 to 11.13;
            Chapter 12: Sections 12.1-12.4

REFERENCE BOOK

1. P. Duraipandian and Laxm I Duraipandian, Mechanics, S.Chand and
   Company Ltd, Ram Nagar, New Delhi -55.
2. Herbert Goldstein, Charles P. Poole, John Safko Classical
   Mechanics Pearson, 3rd Edition.

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(Course Coordinator)	(Syllabus Coordinator)	(BOS Chairperson)

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19CMAT08 – SKILL BASED SUBJECT: ACCOUNTANCY
(Common to Mathematics & Mathematics (CA))

Semester	V
Credit	3
Paper Type	Skill Based Subject
Max. Marks	CIA -30 CE -70 TOTAL =100

COURSE OBJECTIVES

To enable the Students to learn Principles and Concepts of Accountancy.

PREREQUISITES: NIL

UNIT- I INTRODUCTION TO ACCOUNTING
9 Hours

Introduction to Accounting- Meaning, Scope, Need for Accounting– Objectives of Accounting -Accounting Concepts and Conventions - Journal, Ledger, Trial balance.

UNIT- II FINAL ACCOUNTS
9 Hours

Final Accounts - Meaning and importance, Preparation of Trading Account, Profit and Loss Account and Balance Sheet with Simple Adjustments.

UNIT- III PREPARATION OF CASH BOOK & BANK RECONCILIATION STATEMENT
9 Hours

Cash Book - Meaning, Preparation of Cash Book – Cause of difference between Cash book and Pass book, Preparation of Bank Reconciliation Statement.

UNIT-IV DEPRECATION
9 Hours

Concept of Deprecation – Meaning – Characteristics – Causes – Objectives – Methods of deprecation Straight line Method – Diminishing Balance Method -Distinction Between Straight line and Written Down Value Method.

UNIT-V ACCOUNTS OF NON-PROFIT ORGANIZATION
9 Hours

Meaning and Recognition of Capital & Revenue items – Nature of Receipt and Payment Account: Income and Expenditure Account –Preparation of Final Accounts.

Note: Distribution of Marks between Theory and Problems shall be 30% and 70%

TOTAL PERIODS: 45 Hours

TEXT BOOK

1. T. S Reddy and A. Murthy -"Advanced Accountancy" Margham Publiations - Volume I, 2nd Revised Edition, 2011, Reprint 2019.

REFERENCE BOOKS

1. Jain and K. L Narang - "Financial Accounting" - Kalyani Publishers – 20th Edition 2018.Reprint 2019

2. R. L. Gupta, Radhaswamy - "Advanced Accountancy" 18th Edition Reprint – 2018, Sultan Chand & Sons.

COURSE OUTCOMES

After the completion of the Course, the students will be able to:

COURSE OUTCOMES	DESCRIPTION	UNIT	LEVEL
CO1	Identify the Concepts, conventions of accounting; prepare journal ledger and trial balance.	I	L2
CO2	Prepare the Final Statement of Accounts to assess the Profitability and Financial Position of the business.	II	L3
CO3	Prepare Cash Book and Bank Reconciliation Statement.	III	L3
CO4	Ascertain the amount of Deprecation by applying different methods.	IV	L3
CO5	Compute Income and Expenditure and preparation of Balance sheet in case of Non-Profit Organization.	V	L2

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PERSONALITY APTITUDE AND CAREER ENHANCEMENT (PACE- V)

Subject Code: 19CPE05

Common to all the UG streams admitted from AY 2019-20 Onwards

Semester	V
Credit	2
Paper type	Skill based
Max. Marks	Total=100 (Online:50+Verbal Oral: 50)

Instruction Hours per Semester: 40

Aim:

1. To educate and enrich the students on quantitative ability, arithmetic reasoning, and verbal ability.
2. To enhance the students group behavior and team building skills.

Course Objectives

To enable students to,

- Improve quantitative ability and arithmetic reasoning
- Enhance verbal ability through vocabulary building and grammar
- Groom personal & professional attributes
- Master in etiquettes and manners

Unit I Quantitative Ability – III   [8 Hrs]

Numbers, Permutations & Combinations, Geometry, Mensuration, Algebra, Probability, Time And Work.

Unit II Reasoning Ability– III   [8 Hrs]

Logical Deductions, Odd Man Out, Image Based Problems, Direction Sense, Coding and Decoding, Data Sufficiency, Data Interpretation

Unit III   Verbal Ability – III   [8 Hrs]

Verbal Analogies, Sentence   Improvement, Sentence Formation, Choosing the Correct Word, Idioms And Phrases, Odd Words, Paragraph Formation

Unit IV   College to Corporate – I

[8 Hrs]

Resume Preparation; Mock Group Discussion, Mock Interview Sessions, Email and Telephone Etiquette;

Unit V College to Corporate – II

[8 Hrs]

Personal Grooming & Etiquette Social Graces, Etiquette and Body language; Making a Great First Impression: How to present yourself to people; Developing Your Professional and Personal Image; Build self-confidence and self-esteem; Rapport building; Interpersonal Communication; Displaying Courteousness and Thoughtfulness at the Workplace, Power Dressing; Attitude Shaping & Building; Influencing Skills and Persuasion

Course Outcomes

On the successful completion of the course, the student would be able to-

- Enhance their ability to deal with quantities
- Understand and improve arithmetic reasoning.
- Enrich vocabulary and grammar rules
- Draft Resumes and Shape Attitudes.
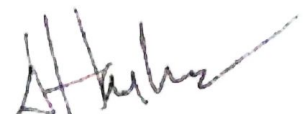- Polish the cross cultural etiquettes to deal with diversity

References

1. Quantitative Aptitude for Competitive Exams by R. S. Agarwal
2. Quantum CAT by Sarvesh Verma
3. A Modern Approach to Logical Reasoning by R. S. Agarwal
4. Verbal Ability and Reading Comprehension by Arun sharma
5. Word Power Made Easy by Norman Lewis
6. High School English Grammar by Wren and Martin
7. English Conversation Practice by Grant Taylor
8. Group Discussion and Interviews by Anand Ganguly
9. Art of Social Media by Guy Kawasaki

Prepared by

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TIP Coordinator

Approved & Verified by

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Vice Principal

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