POOMPUHAR COLLEGE (AUTONOMOUS)

(of the Tamil Nadu H.R & C.E Department)

(Accredited B+ By NAAC)

MELAIYUR - 609 107

B.Sc SYLLABUS

(FROM THE ACADEMIC YEAR 2022-2023 ONWARDS)

PG & RESEARCH
DEPARTMENT OF MATHEMATICS

POOMPUHAR COLLEGE (AUTONOMOUS)

OF THE TAMIL NADU HR & CE DEPARTMENT
MELAIYUR - 609 107

PG & RESEARCH DEPARTMENT OF MATHEMATICS

COURSE STRUCTURE FOR UG COURSE

(Applicable to the candidates admitted from the academic year 2022 – 2023 onwards)

SEMESTER	PART	SUBJECT	HRS	CREDIT	EXAM	MARKS
I	I	Tamil – I	5	3	3	100
	II	English – I	5	3	3	100
	III	First Allied – I	5	3	3	100
		First Allied – II	3	*	*	*
		Core Course – I	4	4	3	100
		Core Course – II	4	4	3	100
	IV	Value Education	2	1	3	100
		Gender Studies	2	1	3	100
	TOTAL		30	19	-	700
II	I	Tamil – II	5	3	3	100
	II	English – II	5	3	3	100
	III	First Allied – II	3	4	3	100
		First Allied – III	5	3	3	100
		Core Course – III	4	4	3	100
		Core Course – IV	4	4	3	100
	IV	Skill Based Elective – I	2	2	3	100
		Environmental Studies	2	1	3	100
	TOTAL		30	25	-	800
III	I	Tamil – III	5	3	3	100
	II	English – III	5	3	3	100
	III	Second Allied – I	4	3	3	100
		Second Allied – II (Practical)	2	*	*	*
		Core Course – V	4	4	3	100
		Core Course – VI	4	4	3	100
		Major Based Elective – I (One out of Two)	4	4	3	100
	IV	Non Major Elective – I	2	2	3	100
	TOTAL		30	23	-	700

Continued…

SEMESTER	PART	SUBJECT	HRS	CREDIT	EXAM	MARKS
IV	I	Tamil – IV	5	3	3	100
	II	English – IV	5	3	3	100
	III	Second Allied – II(Practical)	3	4	3	100
		Second Allied – III	5	3	3	100
		Core Course – VII	4	4	3	100
		Core Course – VIII	4	4	3	100
	IV	Non Major Elective – II	2	2	3	100
		Skill Based Elective – II	2	2	3	100
	TOTAL		30	25	-	800
V	III	Core Course – IX	6	5	3	100
		Core Course – X	6	5	3	100
		Core Course – XI	6	4	3	100
		Major Based Elective – II (One out of Two)	4	4	3	100
		Major Based Elective – III (One out of Two)	4	4	3	100
	IV	Skill Based Elective – III	2	2	3	100
		Skill Based Elective – IV	2	2	3	100
	TOTAL		30	26	-	700
VI	III	Core Course – XII	6	5	3	100
		Core Course – XIII	6	4	3	100
		Core Course – XIV	6	4	3	100
		Core Course – XV	6	4	3	100
		Major Based Elective – IV (One out of Two)	4	4	3	100
	IV	Soft Skills Development	2	1	3	100
	V	Extension Activities	-	1	-	100
	TOTAL		30	23	-	700
	GRAND TOTAL		-	140		4400

Note: * Examination at the end of the even semester

Head of the Department **Principal**

POOMPUHAR COLLEGE (AUTONOMOUS)
OF THE TAMIL NADU HR & CE DEPARTMENT
MELAIYUR - 609 107

B.ScMathematics – Course Structure under CBCS
(For the candidates admitted from the academic year 2022 -2023 onwards)

Semester	Part	Course	Title	Instr Hours /Week	Credit	Exam Hours	Marks		Total
							Internal	External	
I	I	Tamil Language Course - I	Tamil - I	5	3	3	25	75	100
	II	English Language Course-I	English - I	5	3	3	25	75	100
	III	Core Course - I (CC)	Differential Calculus and Trigonometry	4	4	3	25	75	100
		Core Course - II (CC)	Mathematical Statistics	4	4	3	25	75	100
		First Allied Course - I (AC)	Allied Physics – I	5	3	3	25	75	100
		First Allied Course - II (AC)	Allied Physics – II (Practical)	3	-	**	-	-	-
	IV	Value Education		2	1	3	25	75	100
		Gender Studies		2	1	3	25	75	100
			Total	**30**	**19**				**700**
II	I	Tamil Language Course – II	Tamil – II	5	3	3	25	75	100
	II	English Language Course-II	English – II	5	3	3	25	75	100
	III	Core Course - III (CC)	Analytical Geometry (3D) and Integral Calculus	4	4	3	25	75	100
		Core Course – IV (CC)	Theory of Probability	4	4	3	25	75	100
		First Allied Course – II (AC)	Allied Physics – II (Practical)	3	4	3	25	75	100
		First Allied Course – III (AC)	Allied Physics - III	5	3	3	25	75	100
	IV	Skill Based Elective - I	Fundamentals of computer	2	2	3	25	75	100
		Environmental Studies		2	1	3	25	75	100
			Total	**30**	**25**				**800**

Semester	Part	Course	Title	Instr Hours /Week	Credit	Exam Hours	Marks		Total
							Internal	External	
III	I	Tamil Language Course – III	Tamil – III	5	3	3	25	75	100
	II	English Language Course- III	English – III	5	3	3	25	75	100
	III	Core Course – V (CC)	Classical Algebra	4	4	3	25	75	100
		Core Course – VI (CC)	Theory of Equations	4	4	3	25	75	100
		Major Based Elective-I	Mechanics / Fluid Dynamics	4	4	3	25	75	100
		Second Allied Course – I (AC)	Allied Chemistry - I	4	3	3	25	75	100
		Second Allied Course – II (AC)	Allied Chemistry – II (Practical)	2	-	**	-	-	-
	IV	Non Major Elective – I	Fundamentals of Mathematical Statistics – I	2	2	3	25	75	100
			Total	**30**	**23**				**700**
IV	I	Tamil Language Course – IV	Tamil – IV	5	3	3	25	75	100
	II	English Language Course – IV	English – IV	5	3	3	25	75	100
	III	Core Course – VII (CC)	Vector Calculus and Fourier Series	4	4	3	25	75	100
		Core Course – VIII (CC)	Sequences and Series	4	4	3	25	75	100
		Second Allied Course – II (AC)	Allied Chemistry – II (Practical)	3	4	3	25	75	100
		Second Allied Course – III (AC)	Allied Chemistry - III	5	3	3	25	75	100
	IV	Non Major Elective – II	Fundamentals of Mathematical Statistics- II	2	2	3	25	75	100
		Skill Based Elective – II	Windows Operating System	2	2	3	25	75	100
			Total	**30**	**25**				**800**

Semester	Part	Course	Title	Instr Hours /Week	Credit	Exam Hours	Marks		Total
							Internal	External	
V	III	Core Course – IX (CC)	Differential Equations and Laplace Transforms	6	5	3	25	75	100
		Core Course – X (CC)	Abstract Algebra	6	5	3	25	75	100
		Core Course – XI (CC)	Real Analysis	6	4	3	25	75	100
		Major Based Elective-II	Programming in C / Programming in C ++ With OOP	4	4	3	25	75	100
		Major Based Elective-III	Discrete Mathematics/ Automata Theory	4	4	3	25	75	100
	IV	Skill Based Elective – III	M.S – Word	2	2	3	25	75	100
		Skill Based Elective – IV	M.S - Excel and Power point	2	2	3	25	75	100
			Total	**30**	**26**				**700**
VI	III	Core Course – XII (CC)	Complex Analysis	6	5	3	25	75	100
		Core Course – XIII (CC)	Graph Theory	6	4	3	25	75	100
		Core Course – XIV (CC)	Operations Research	6	4	3	25	75	100
		Core Course – XV (CC)	Methods In Numerical Analysis	6	4	3	25	75	100
		Major Based Elective -IV	Astronomy / Mathematical Methods	4	4	3	25	75	100
	IV	Soft Skills Development		2	1	3	25	75	100
	V	Extension Activities		-	1	-	-	-	100
			Total	**30**	**23**				**700**
			Grand Total	**180**	**140**				**4400**

POOMPUHAR COLLEGE (AUTONOMOUS)

OF THE TAMIL NADU HR & CE DEPARTMENT
MELAIYUR - 609 107

COURSE STRUCTURE FOR ALL UG DEGREE COURSES

(Applicable to the candidates admitted from the academic year 2022 – 2023 onwards)

PART	NAME OF THE PAPERS	NUMBER OF PAPERS	CREDITS
I	TAMIL	04	12
II	ENGLISH	04	12
III	CORE (INCLUDING OPTIONAL)	19	79
	FIRST ALLIED	03	10
	SECOND ALLIED	03	10
IV	NON-MAJOR ELECTIVE	02	04
	SKILLBASED ELECTIVE	04	08
	VALUE EDUCATION	01	01
	ENVIRONMENTAL STUDIES	01	01
	SOFT SKILLS DEVELOPMENT	01	01
	GENDER STUDIES	01	01
V	EXTENSION ACTIVITIES	01	01
	TOTAL	**44**	**140**

Head of the Department Principal

List of Allied Courses

1. Physics

2. Chemistry

Note:

	Internal Marks	External Marks
1. Theory	25	75
2. Practical	40	60

3. Separate passing minimum is prescribed for Internal and External marks

The passing minimum for CIA shall be 40% out of 25 marks [ie, 10 marks]

The passing minimum for External Examinations shall be 40% out of 75 marks [ie, 30 marks]

** Examination at the end of the next semester.

Extension activities shall be outside the instruction hours.

Question Paper Pattern (for Part I, II, III)

Part A

Ten questions 10 x 2 = 20 marks

(Two questions from each unit – No choice)

Part B

Five questions (either or type) 5 x 5 = 25 marks

(One question from each unit)

Part C

Three questions out of five 3 x 10 = 30 marks

(One question from each unit)

Total 75 marks

Question Paper Pattern (for Part IV only)

Part A

Three questions (either or type) 3 x 10 = 30 marks

(One question from each unit)

Part B

Three questions out of five 3 x 15 = 45 marks

(Atleast one question from each unit,

Not more than two questions from each unit,

No unit shall be omitted)

Total 75 marks

Head of the Department **Principal**

Programme Outcomes:

PO1: Disciplinary Knowledge: Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate programme of study.

PO2: Critical Thinking: Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.

PO3: Problem Solving: Capacity to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one's earning to real life situations.

PO4: Analytical&Scientific Reasoning: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples and addressing opposing viewpoints.Ability to analyse, interpret and draw conclusions from quantitative / qualitative data; and critically evaluate ideas, evidence, and experiences from an open minded and reasoned perspective.

PO5: Self-directed & Lifelong Learning: Ability to work independently, identify and manage a project. Ability to acquire knowledge and skills, including "learning how to learn", through self-placed and self-directed learning aimed at personal development, meeting economic, social and cultural objectives.

Programme Specified Outcomes:

PSO1: Acquire good knowledge and understanding, to solve specific theoretical & applied problems in different area of mathematics & statistics.

PSO2: Understand, formulate, develop mathematical arguments, logically and use quantitative models to address issues arising in social sciences, business and other context /fields.

PSO3: To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate start-ups and high potential organizations.

PSO4: To apply their skill and knowledge that is translate information presented verbally into mathematical form, select and use appropriate mathematical formulate or techniques in order to process the information and draw the relevant conclusion.

PSO5: Enabling students to develop a positive attitude towards mathematics as an interesting and valuable subject of study.

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : I	**No of hours : 4**
Part III : Core Paper I	**No of credits : 4**

Title of the Paper: DIFFERENTIAL CALCULUS AND TRIGONOMETRY

Objectives:
1. To inculcate the basics of differentiation and their applications.
2. To introduce the notion of curvatures, Evolute& Involute and polar co-ordinates.
3. To understand the basic concepts of Trigonometry

Unit - I

Methods of successive differentiation – Leibnitz's theorem and its applications– Increasing and decreasing functions –Maxima and Minima of function of two variables.

Unit - II

Curvature – Radius of curvature in Cartesian coordinates and polar coordinates – Centre of curvature – Evolute and Involute .

Unit - III

Expansions of sin (nx), cos (nx), tan (nx) – Expansions of $\sin^n x$, $\cos^n x$ – Expansions of sin(x),cos(x), tan(x) in ascending powers of x.

Unit - IV

Hyperbolic functions – Relation between hyperbolic & circular functions– Inverse hyperbolic functions.

Unit - V

Logarithm of a complex number – Summation of trigonometric series – Difference method– Angles in arithmetic progression method – Gregory's series

Text Books :

[1] S.Narayanan, T.K.ManickavasagamPillai, Calculus, Vol .I, S.V Publications, 2014. (Units I and II)

[2] S.Arumugam, A.ThangapandiIssac, Theory of equations and Trignometry, New Gamma Publications, 2006. (Units III, IV and V)

Unit -I: Chapter III, Sections 1.1 to 1.6, 2.1, 2.2
Chapter IV, Sections 2.1,2.2
Chapter VIII, Section 4.1 [1]

Unit -II : Chapter X, Sections 2.1 to 2.6 [1]

Unit –III: Chapter VI, Sections 6.1 to 6.3 [2]
Unit –IV: Chapter VII, Sections 7.1, 7.2 [2]
Unit – V: Chapter VIII, Section 8.1
Chapter IX, Sections 9.1,9.2, and 9.4 [2]

Reference Books :

[1] S.Arumugam and Isaac, Calculus, Volume1, New Gamma Publishing House, 1991.
[2] S.Narayanan, T.K.ManichavasagamPillai, Trigonometry, S.ViswanathanPvt Limited and Vijay Nicole Imprints PvtLtd, 2004.

Course outcomes:

At the end of the course the student will be able to

1. Demonstrate the properties of higher derivatives
2. Examine the maxima and minima functions
3. Perceive the difference between trigonometric function and hyperbolic functions
4. Determine the sum of the trigonometry series.
5. Understand the concept of logarithm of complex numbers.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2
CO2	3	2	3	3	2
CO3	3	3	2	2	2
CO4	2	3	2	3	2
CO5	3	3	2	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : I	**No of hours : 4**
Part III : Core Paper II	**No of credits : 4**

Title of the Paper: MATHEMATICAL STATISTICS

Unit - I

Measure of Central Tendency: Introduction – Frequency Distribution – Graphical representation of a frequency distribution – Averages – Arithmetic mean – Median – Mode – Geometric mean – Harmonic mean.

Unit - II

Measure of Dispersion: Range – Quartile deviation – Mean deviation – Standard deviation – Coefficient of variation – Moments – Skewness – Kurtosis.

Unit - III

Correlation and Regression: Meaning of Correlation – Scatter Diagram – Karl Pearson's Coefficient of Correlation – Calculation of the correlation for bivariate frequency distribution – Probable error of correlation coefficient – Rank correlation – Linear regression – Curvilinear regression – Regression curves.

Unit - IV

Time series: Introduction – Definition of a time series – Utility of a time series – Components of a time series – Analysis of a time series – Uses of a time series – Mathematical models for a time series – Editing of a time series – Measurement of trend – Graphic Method – Method of semi-averages – Method of moving averages – Weighted moving average – Least squares.

Unit - V

Statistical quality control: Statistical quality Control – Causes of Variations – Advantages of Statistical quality Control – Types of quality control – Control Charts – Determination of control limits – Types of control chart – Mean chart – Range chart – Standard deviation chart.

Text Book :

[1] S.C.Gupta, V.K.Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand and Sons, New Delhi, 2015.

Unit - I : Chapter 2 Sections 2.1 to 2.9
Unit - II : Chapter 2 Sections 2.13 to 2.17

Unit - III : Chapter 10, Sections 10.1 to 10.7
Chapter 11, Sections 11.1 to 11.19
Unit - IV : Chapter 14, Sections 14.1 to 14.3
Unit - V : Chapter 23, Sections 23.1 to 23.11

Reference Books :

[1] Gupta, S.C, Fundamentals of Applied Statistics, S. Chand & Sons, New Delhi, 1993.
[2] Gupta, S.C, Statistical Methods, Sultan Chand, New Delhi, 2002.
[3] Speigal, M.R, Theory and Problems of Statistics, McGraw Hill Book Co., London, 1992.

Course outcomes:

At the end of the course the student will be able to

1. Gain the knowledge of techniques in solving real life problems.
2. Analyse the Correlation and Regression concepts.
3. Knowledge of solving the problems on curve fitting.
4. Understand the concept of time series analysis
5. Determine the control limits and draw the related control charts

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2
CO2	3	3	2	3	2
CO3	3	2	3	2	2
CO4	2	3	3	3	2
CO5	3	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : II	**No of hours : 4**
Part III : Core Paper III	**No of credits : 4**

Title of the Paper: ANALYTICAL GEOMETRY (3D) AND INTEGRAL CALCULUS

Objectives:

1. To study about three dimensional Cartesian Co-ordinates system
2. To inculcate the basics of integration and their applications.

Unit - I

Standard equation of a plane – Intercept form - Normal form – Plane passing through given points – Angle between planes – Plane through the line of intersection of two planes – Equation of the straight line – Shortest distance between two skew lines – Equation of the line of shortest distance.

Unit - II

Sphere – Standard equation – Sphere passing through a given circle – Intersection of two spheres – Tangency of spheres.

Unit - III

Properties of definite integrals: Integration by parts – Reduction formula.

Unit - IV

Multiple integrals – definition of the double integral – evaluation of the double integral – double integral in polar co-ordinates – triple integrals.

Unit - V

Beta and Gamma functions – definitions – convergence of $\Gamma(n)$ – Recuurence formula for gamma functions - Properties of Beta functions and the relation between them.

Text Books :

[1] T.K.ManickavasagamPillai andT.Natarajan, Analytical Geometry, S.V Publications, 1985 Revised Edition.(Units I and II)
[2] S.Narayanan and T.K.ManickavasagamPillai, Calculus, Vol.II, SV Publications, 2009. (Units III, IV and V).

Unit -I : Chapter II Sections 1 to 10

Chapter III, Sections 1 to 8. [1]

Unit -II : Chapter IV Sections 1 to 8.[1]

Unit - III: Chapter I, Sections 11, 12, 13, 13.3-13.9 [2]

Unit - IV:Chapter V, Sections 1, 2.1. 2.2, 3.1, 3.2, 4 [2]

Unit -V :Chapter VII, Sections 2.1-2.3, 3, 4, 5 [2]

Reference Books :

[1] Duraipandian and Chatterjee, Analytical Geometry.

[2] Piskunov .N, Differential and integral calculus, Volume 1.

Course outcomes:

At the end of the course the student will be able to

1. Illustrate the knowledge of geometry and its applications
2. Apply appropriate techniques, tools and formulas to determine measurements in geometry
3. Formulate the equations of line, plane and sphere.
4. Evaluate multiple integrals
5. Understand the recurrence formula and properties of beta and gamma function.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2
CO2	3	3	2	2	2
CO3	3	2	3	3	2
CO4	2	3	3	3	2
CO5	3	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : II	**No of hours : 4**
Part III : Core Paper IV	**No of credits :4**

Title of the Paper: THEORY OF PROBABILITY

Objectives:

1. To inculcate the basics of theory of probability.
2. To understand the concepts of correlation, regression & distributions.

Unit - I

Theory of Probability – Definition of probability sample space – Probability of an event - Independence of events – Theorems on Probability – Conditional Probability – Baye's Theorem (simple problems only)

Unit – II

Random variables – Distribution functions – Discrete & continuous random variables – Probability mass & density functions – Joint probability distribution functions.

Unit – III

Expectation – Variance – Moment generating functions – Theorems on Moment generating functions –Moments – Various measures.

Unit – IV

Moment generating function –some limitations- properties- cumulants- characteristics functions (simple problems only) – Chebychev's Inequality.

Unit – V

Theoretical Discrete & Continuous distributions – Binomial, Poisson, Normal distributions - Moment generating functions of these distributions – Additive properties of these distributions - Recurrence relations for the moments about origin and mean for the Binomial. Poisson and Normal distributions – Properties of normal distributions.(simple problems only)

TEXT BOOK:

S.C.GUPTA & V.K. KAPOOR ,Fundamental of Mathematical Statistics, Sultan Chand & Sons Publications, NewDelhi, 2005.

UNIT – I: Chapter 3: Section 3.8 – 3.15, Chapter 4: Section 4.2 only
UNIT – II :Chapter 5: Section 5.1- 5.5
UNIT – III: Chapter 6: Section 6.1 – 6.6
UNIT – IV: Chapter 7: Section 7.1 – 7.3, 7.5
UNIT – V: Chapter 8: Section 8.4.1, 8.4.2, 8.4.6 ,8.4.7, 8.5.4, 8.5.5, 8.5.8
Chapter 9: Section9.2.2 , 9.2.5, 9.2.7

REFERENCE BOOK

[1] Thambidurai .P, Practical Statistics, Rainbow publishers – CBE (1991)0
[2] Dr. P.R. Vittal "Mathematical Statistics" Margham Publications Chennai.

COURSE OUTCOMES:

After completion of the course, students will be able to

1. Gain the basics of theory of probability.
2. Demonstrate the knowledge of discrete and continuous probability distribution.
3. Understand the concept of mathematical expectations
4. Understand the concept of moment generating function and Chebychev's Inequality
5. Understand the concept of various theoretical Discrete & Continuous distributions

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	2	3	3	2	2
CO2	3	3	3	3	2
CO3	3	2	2	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
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(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : III	**No of hours : 4**
Part III : Core Paper V	**No of credits : 4**

Title of the Paper: CLASSICAL ALGEBRA

Objectives:

1. To lay a good foundation for the study of Theory of Equations.
2. To train the students in operative algebra.

Unit - I

Binomial theorem: Binomial theorem for a rational index – Some important particular cases of the Binomial expansion – Application of the Binomial theorem to the summation of series.

Unit - II

Exponential and logarithmic series: Exponential limit – Exponential theorem – summation of exponential series – Logarithmic series – Summation of logarithmic series.

Unit - III

Types of Matrices – Rank of a matrix – Simultaneous linear equations – Cayley Hamilton theorem (**proof not needed**) – Eigen values and eigen vectors

Unit - IV

Theory of numbers: Divisibility algorithm –Generalized division algorithm -G.C.D-Euclidean algorithm - Unique factorization theorem – Simple problems only.

Unit - V

Congruences – Chinese remainder theorem – Fermat's theorem – Euler's theorem – Simple problems.

Text Books :

[1] T.K.ManickavasagamPillai, T.Natarajan, K.S.Ganapathy, Algebra Volume I, S.V

Publications –2015 Revised Edition (Unit I and II)

[2] S. Arumugam, Isaac .A.T , Modern Algebra, Seitech Publications, India pvt limited, 2007. (Unit III)

[3] Arumugam ISAAC, Theory of equations & Trigonometry, New Gamma Publishing House, 2006 (Unit IV and V)

Unit - I : Chapter 3, Sections 5,6,10 [1]

Unit - II :Chapter 4, Sections 1 to 3,5,9 [1]

Unit - III: Chapter 7, Sections 7.2, 7.5 to 7.8 [2]

Unit - IV: Chapter 2. [3]

Unit -V : Chapter 3 (Pages 3.1 to 3.22) [3]

Reference Books :

[1]H.S.Hall and S.R. Knight. Higher Algebra, Prentice Hall of India, New Delhi,

[2]H.S.Hall and S.R. Knight. Higher Algebra, McMillan and Co. London. 1948.

Course outcomes:

At the end of the course the student will be able to

1. Understand to find the summation of Binomial, Exponential and Logarithmic series.
2. Know to solve the systems of linear equations.
3. Acquire idea about number theory.
4. Understand the concept of algorithms to find the factors of composite numbers
5. Understand the concept of congruence and its related theorems.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2
CO2	2	3	3	3	2
CO3	3	2	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

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Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : III	**No of hours : 4**
Part III : Core Paper VI	**No of credits : 4**

Title of the Paper: THEORY OF EQUATIONS

Objectives:

1.To study about inequalities, arithmetic, geometric and harmonic mean
2. To study the basic concept of theory of equation.

Unit - I

Theory of equations: Introduction – Formation of equations – Relation between roots and co – efficient – sum of the powers of the roots.

Unit - II

Reciprocal equations – Transformation of equations – Removal of terms – Multiple roots.

Unit- III

Nature and position of roots: Rolles theorem, sturms theorem – cubic equations: cardan's method.

Unit - IV

Bi – quadratic equations: Ferrari's method, Approximate solutions of numerical equations: Newton's method, Horner's method.

Unit - V

Inequalities - Triangle inequality, the arithmetic , geometric and harmonic means, Cauchy – Schwarz inequality, some more inequalities, miscellaneous solved problems.

Text Book :

[1]Arumugam ISAAC, Theory of equations & Trigonometry, New Gamma Publishing House, 2006.

Unit-I: Chapter V, Sections 5.1 to 5.3

Unit–II: Chapter V, Sections 5.4 to 5.6.

Unit–III :Chapter V, Sections 5.7 to 5. 8

Unit-IV :Chapter V , Sections 5.9,5.10.

Unit - V : Chapter IV, Sections 4.1 to 4.6

Reference Books :

[1] T.K Manicavachagompillay, T. Natarajan, K.S Ganapathy, Algebra, Volume 1, 2015.

[2]H.S.Hall and S.R. Knight. Higher Algebra, Prentice Hall of India, New Delhi,

Course outcomes:

At the end of the course the student will be able to

1. Know the relationship between roots and coefficients.
2. Identify the nature and position of the roots of the given equation.
3. Know the theory of equation concepts.
4. Find the numerical solution of Bi – quadratic equations
5. Learn the various properties of inequalities and its related results.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	3	3	3	2
CO3	3	2	3	3	2
CO4	3	3	2	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : IV	**No of hours : 4**
Part III : Core Paper VII	**No of credits : 4**

Title of the Paper: VECTOR CALCULUS AND FOURIER SERIES

Objectives:

1. To provide the basic knowledge of vector differentiation and vector integration.
2. To solve the vector differentiation and vector integration problems.
3. To understand the basics of Fourier series and solve the related problems.

Unit - I

Vector differentiation: – Velocity and acceleration– Gradient, Curl and Divergence– Divergence and Curl of a Vector point function - Vector identities – Simple problems.

Unit -II

Vector integration: Line integral - Surface and Volume integral – Simple problems.

Unit - III

Gauss Divergence Theorem –Stoke's Theorem – Green's Theorem – Simple problems and verification of the theorems for simple problems.

Unit - IV

Fourier series – Definition – Fourier Series expansion of periodic functions with Period 2π– Use of odd and even functions in Fourier Series.

Unit - V

Half-range Fourier series – Definition – Development in cosine series and in sine series – Change of interval –Combination of series.

Text Books

[1] P.RVittal, V. Malini,Vector Calculus Fourier Series and Fourier Transforms, Margham Publications, 2007. (Units I to III)

[2]S.Narayanan, T.K.ManickavasagamPiliai, Calculus, Vol. III, S. Viswanathan Pvt Ltd,2011. (Units IV, V)

Unit - I :Chapter I [1]

Unit - II :Chapter II [1]

Unit - III:Chapter II [1]

Unit - IV:Chapter VI, Sections 1 to 3 [2]

Unit -V: Chapter VI, Sections 4 to 7 [2]

Reference Books :

[1] P.Kandasamy, K.Thilagavathi, Vector Calculus Fourier Series and Fourier Transforms,

S. Chand & Company Ltd, 2005.

Course outcomes:

At the end of the course the student will be able to

1. Perceive the knowledge of vector differentiation and vector integration.
2. Formulate the relationship between gradient, divergence and curl
3. Determine the sum of the cosines and sine series
4. Determine the Fourier expansion of functions
5. Expand the functions as Fourier sine and cosine series

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	2	3	3	3	2
CO4	3	3	2	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : IV	**No of hours : 4**
Part III : Core Paper VIII	**No of credits : 4**

Title of the Paper: SEQUENCES AND SERIES

Objectives:

1. To study the concept of sequences and series.

2. To identify the behavior of convergence of the series by using various tests.

Unit - I

Sequence (definition) – Limit of a sequence - Convergence of a sequence –Cauchy's first theorem on limits - Bounded sequences – The upper and lower limits of a sequence - Cauchy's general principle of convergence – Monotonic sequence - Monotonic sequence always tends to a limit finite or infinite.

Unit - II

Infinite series –Definition of convergence, divergence and oscillation – Convergence of geometric series - Some general theorems concerning infinite series – Series of positive terms - Necessary condition for convergence — Comparison tests - Convergence of the series $\sum \frac{1}{n^k}$.

Unit - III

Cauchy's condensation test –D'Alembert's ratio test –Cauchy's root test and their simple problems.

Unit – IV

Raabe's test –Absolutely convergent series – Leibnitz's test and their simple problems.

Unit - V

General summation of series including successive difference and recurring series.

Text Book :

[1] T.K. ManickavasagamPillai, T. Natarajan, K.S. Ganapalhy, Algebra, Vol. I,
S. ViswanathanPvt Limited, Chennai. 2004.

Unit – I: Chapter II, Sections 4, 6 & 7

Unit - II: Chapter II, Sections 8 to 14

Unit –III: Chapter II, Sections 15 to 17

Unit - IV: Chapter II,Sections 18 to 24

Unit - V: Chapter V

Reference Books :

[1] M.K.Singal, Asha Rani Singal, A first course in Real Analysis, R. Chand & Co.1999.

[2] Dr.S.Arumugam, Sequences and Scries, New Gamma Publishers, 1999.

Course outcomes:

At the end of the course the student will be able to

1. Understand the behaviour of monotonic sequences.
2. Know about the limits.
3. Get idea about the behaviour of convergence and divergence of series by using various tests.
4. Solve the problems related to sequences and series.
5. Test the convergences of the series

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
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Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 6**
Part III : Core Paper IX	**No of credits :5**

Title of the Paper: DIFFERENTIAL EQUATIONS AND LAPLACE TRANSFORMS

Objectives:

1. To know the order and degree of the ODE's
2. To make difference between ODE and PDE
3. To know the concept of Laplace transforms and its inverse with applications

Unit - I

First order, higher degree differential equations solvable for x, solvable for y, solvable for $\frac{dy}{dx}$ –Clairaut's form – Conditions of integrability of Mdx + Ndy = 0 – Simple problems.

Unit - II

Particular integrals of second order Differential Equations with constant coefficients – Linear equations with variable coefficients – Method of variation of parameters (omit third and higher order equations)

Unit - III

Formation of Partial Differential Equation – General ,particular and complete integrals – Solution of PDE of the standard forms – Lagrange's method of solving –Charpit's method and a few standard forms.

Unit - IV

PDE of second order homogeneous equation with constant coefficients – Particular integrals of F (D,D') z = f (x,y), where f (x,y) is of one of the forms $e^{(ax+by)}$, sin (a x + b y), cos (a x + b y), $x^r y^s$, and $e^{(ax+by)}$ f(x,y).

Unit - V

Laplace transforms – Standard formulae – Basic theorems and simple applications – Inverse Laplace transform – Use of Laplace transform in solving ODE with constant coefficients.

Text Books :

[1]S.Narayanan, T.K.ManickavasagamPillai, Calculus, Vol. III, S.V Publications, 2011.

(Units I, II, III, V)

[2] M.D.Raisinghania, Ordinary and Partial Differential Equations, S. Chand & Co.,New Delhi, 2006. (Unit IV)

Unit - I : Chapter I, Sections 3.1 to 3.3, 4, 5.1 to 5.5, 6.1 [1]

Unit - II : Chapter II, Sections 1.1 , 1.2, 2, 3, 4, 8.1 to 8.3, 10 [1]

Unit - III: Chapter IV Sections 2.1, 2.2, 5.1 to 5.4, 6.1, 7 [1]

Unit - IV: Part Three, Chapter III, Sections 3.1 to 3.7 [2]

Unit - V : Chapter V Sections 1.1, 1.2, 4, 5, 6, 7, 8 [1]

Reference Books :

[1] S.Narayanan, Differential Equations, S.Viswanathan Publishers, 1996.

[2] M.L. Khanna, Differential Calculus, Jaiprakashnath and Co., Meerut, 2004.

Course outcomes:

At the end of the course the student will be able to

1. Find the solutions of linear ordinary and partial differential equations.
2. Categorize the partial differential equations
3. Formulate the partial differential equation suing various methods
4. Solve PDE of second order homogeneous equation with constant coefficients.
5. Solve ODE using the concept of Laplace Transform.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 6**
Part III : Core Paper X	**No of credits : 5**

Title of the Paper: ABSTRACT ALGEBRA

Objectives:

1. To introduce the concept of Algebra from the basic set theory and functions etc.,
2. To introduce the concept of Group Theory, Rings and Vector Spaces.

Unit - I

Groups: Subgroups – Cyclic groups – Order of an element – Cosets and Lagrange's theorem.

Unit - II

Normal subgroups and Quotient groups – Isomorphism –Homomorphisms.

Unit - III

Rings: Definition and examples – Elementary properties of rings – Isomorphism – Types of rings –Characteristic of a ring - Subrings – Ideals – Quotient rings – Maximal and Prime ideals - Homomorphism of rings .

Unit - IV

Vector Spaces : Definition and examples – Subspaces – Linear transformation – Span of a set – Linear independence.

Unit - V

Basis and Dimension – Rank and Nullity – Matrix of a linear transformation.

Text Book :

[1] S.Arumugam, A.Thangapandi Isaac, Modern Algebra, Scitech Publications Pvt Ltd,

2007.

Unit - I :Chapter III, Sections 3.5 to 3.8

Unit - II:Chapter III,Sections 3.9 to 3.11

Unit - III:Chapter IV, Sections 4.1 to 4.10

Unit - IV:Chapter V, Sections 5.1 to 5.5

Unit - V: Chapter V, Sections 5.6 to 5.8

Reference Books :

[1] T.K. ManickavasagamPillai, T.Natarajan, K.S. Ganapathy, Algebra, Vol. I, S.ViswanathanPvt Limited, Chennai, 2004
[2] M.L. Santiago,Modern Algebra, Tata McGraw Hill, 2003.

Course outcomes:

At the end of the course the student will be able to

1. Acquire knowledge of basic abstract systems of mathematics.
2. Know the concepts and properties of various algebraic structures.
3. Understand the importance of homomorphism and isomorphism in various algebraic structures.
4. Understand the concepts of groups, rings and vector spaces.
5. Define the linear transformation, linearly independence and lineally dependence on vector space

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	2	3	3	2
CO2	2	3	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	2	2
CO5	3	3	3	3	2

1-Low 2-Moderate 3- High

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 6**
Part III : Core Paper XI	**No of credits : 4**

Title of the Paper: REAL ANALYSIS

Objectives:

1. To provide a comprehensive idea about the real number system.

2. To understand the concept of continuity, Differentiation and Riemann Integrals.

Unit - I

Real Number system – Field axioms – Order relation in R – Absolute value of a real number and its properties – Supremum andInfimum of a set – Order completeness property – countable and uncountable set.

UNIT - II

Continuous functions – Limit of a function – Algebra of limits – Continuity of a function – Types of discontinuities – Elementary properties of continuous functions – Uniform continuity of function.

UNIT - III

Differentiability of a function – Derivability and continuity – Algebra of derivatives – Inverse function Theorem – Daurboux's theorem on derivatives.

UNIT - IV

Rolle's theorem – Mean value theorems on derivatives – Taylor's theorem with remainder – Power series expansion.

UNIT - V

Riemann integration – Definition – Daurboux's theorem – Conditions for integrability –Integrability of continuous and monotonic functions – Integral functions – Properties of integrable functions – Continuity and derivability of integral functions – The first Mean value theorem and the fundamental theorem of Calculus.

Text Books :

[1] M.K,Singhal, Asha Rani Singhal, A First Course in Real Analysis, R.Chand& Co., 1997. (Units I to IV)

[2]Shanthi Narayan, A Course of Mathematical Analysis, S. Chand & Co., 1995. (Unit V)

Unit – I- Chapter 1 of [1]
Unit – II - Chapter 5 of [1]
Unit – III - Chapter 6 – Sec 1 to 5 of [1]
Unit – IV - Chapter 8 – Sec 1 to 6 of [1]
Unit – V - Chapter 9 [2]

Reference Book :

[1]Gold Berge, Richar R,Methods of Real Analysis, Oxford & IBHP Publishing Co., New Delhi, 1970.

Course outcomes:

At the end of the course the student will be able to

1. Illustrate the effect of uniform convergence on the limit functions with respect to continuity, differentiability and integrability.
2. Apply the mean value theorems, Taylor's theorem and L'Hospitals rules.
3. Locate and classify discontinuities of a given functions.
4. Understand the concept about Riemann Integration
5. Acquire the knowledge about Inerrability of continuous and monotonic functions

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 6**
Part III : Core Paper XII	**No of credits : 5**

Title of the Paper: COMPLEX ANALYSIS

Objectives:

1. To know about complex Integral functions with Cauchy's Theorem, power series expansions of Taylor's and Laurant's series.
2. To understand the singularity concepts and residues, solving definite integrals using the residue concepts.

Unit - I

Functions of a complex variable – Limits – Theorems on limits – Continuous functions -Differentiability – Cauchy - Riemann equations – Analytic functions – Harmonic functions.

Unit – II

Elementary transformations – Bilinear transformations – Cross ratio – Fixed points of bilinear transformation – Some special bilinear transformations.

Unit – III

Complex integration – Definite integral – Cauchy's theorem – Cauchy's integral formula – Higher derivatives.

Unit – IV

Series expansions – Taylor's series – Laurent's Series – Zeroes of analytic functions - Singularities.

Unit – V

Residues – Cauchy's Residue theorem – Evaluation of definite integrals.

Text Book :

[1] S.Arumugam, A.Thangapandi Isaac, andA.Somasundaram, Complex Analysis, New

Gamma Publishing House, 1999.

Unit - I : Chapter II, Sections 2.1 to 2.8

Unit - II : Chapter III, Sections 3.1 to 3.5

Unit - III : Chapter VI, Sections 6.1 to 6.4

Unit - IV : Chapter VII, Sections 7.1 to 7.4

Unit - V : Chapter VIII, Sections 8.1 to 8.3

Reference Books :

[1]P.P Gupta, Kedarnath,Ramnath, Complex Variables, Meerut, Delhi.

[2] J.N.Sharma, Functions of a Complex variable, Krishna Prakasan Media (P) Ltd., 13th Edition, 1996.

[3] T.K.ManickavasagamPillai, Complex Analysis, S.Viswanathan Publishers Pvt Ltc, 1994.

Course outcomes:

At the end of the course the student will be able to

1. Understand differentiation and integration of complex functions
2. Construct an analytical function using various method.
3. Evaluate integrals using Cauchy's theorem, Cauchy's integral formula and residue theorem.
4. Determine the Taylor's and Laurent's Series expansion of complex valued functions.
5. Evaluation of definite integrals based Cauchy's Residue theorem.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 6**
Part III : Core Paper XIII	**No of credits : 4**

Title of the Paper: GRAPH THEORY

Objectives:

1. To introduce the notion of graph theory.
2. To learn the applications of graph theory

Unit - I

Definition of a Graph – Application of Graphs – Finite and Infinite Graphs – Incidence and Degree – Isolated Vertex, Pendent Vertex and Null Graph – Isomorphism – Sub graphs – Walks, Paths and Circuits – Connected Graphs, Disconnected Graphs and Components – Euler Graphs – Operations on Graphs – More on Euler Graphs – Hamiltonian Paths and Circuits.

Unit - II

Trees – Some Properties of Trees – Pendent Vertices in a Tree – Distance and Centers in a Tree – Rooted and Binary Trees – Spanning Trees – Fundamental Circuits – Finding all Spanning Trees of a Graph – Spanning Trees in a Weighted Graph.

Unit - III

Cut-Sets – Some Properties of a Cut-Set – All Cut-Sets in a Graph – Fundamental Circuits and Cut-Sets – Connectivity andSeparability.

Unit - IV

Vector space of a graph: Sets with one, two operations – Modular Arithmetic and Galois Fields – Vectors and Vector spaces – Basis Vectors of a Graph – Circuit and Cut-Set Subspaces - Orthogonal Vectors and Spaces.

Unit - V

Matrix Representation of Graphs: Incidence Matrix – Submatrices of Incidence matrix – Circuit Matrix – Fundamental Circuit Matrix and Rank of the Circuit Matrix – Cut-Set Matrix – Adjacency Matrix.

Text Book :

[1] NarsinghDeo, Graph Theory with Applications to Engineering and Computer Science, Prentice Hall of India, New Delhi, 2005.

Unit - I : Chapter I, section 1.1 to 1.5 and Chapter II, Sections 2.1, 2.2, 2.4 to 2.9
Unit - II: Chapter III, Sections 3.1 to3.5, 3.7 to 3.10
Unit - III: Chapter IV, Sections 4.1 to 4.5
Unit - IV: Chapter VI, Section 6.1 to 6.8
Unit - V: Chapter VII, Sections 7.1 to 7.4, 7.6, 7.9

Reference Books :

[1] Dr.S.Arumugam,Dr. S. Ramachandran, Invitation to Graph Theory, Scitech Publications India Pvt Limited, Chennai, 2001.
[2] K.R.Parthasarathy, Basic Graph Theory, Tata McGraw Hill Publishing Company New Delhi, 1994.
[3] G.T. John Clark, Derek Allan Holten, A First Look at Graph Theory, World Scientific Publishing company, 1995.

Course outcomes:

At the end of the course the student will be able to

1. Acquire knowledge about graphs.
2. Understand the applications of graphs.
3. Know the relation between matrices and graph theory.
4. Understand the concept of cut-sets and its applications.
5. Getting the idea about representation of graphs by matrices.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 6**
Part III : Core Paper XIV	**No of credits : 4**

Title of the Paper: OPERATIONS RESEARCH

Objectives:

1. To introduce the various techniques of Operations Research.
2. To make the students solve real life problems in Business and Management

Unit - I

Linear programming problem – Mathematical formulation – Graphical Solution – Standard form of LPP – Simplex method.

Unit - II

Artificial Variable Technique – Primal and Dual problems – Duality – Dual Simplex method.

Unit - III

General Transportation Problem – North – west corner rule, Least cost, VAM, Modi Methods, Degeneracy unbalanced problems. Assignment problem : Hungarian method – Unbalanced assignment problem.

Unit - IV

Two person Zero sum games – The Maximin –Minimax Principle – Games without Saddle points – Mixed Strategies – Graphical Solution of 2 x n and m x 2 games – Dominance property.

Unit - V

Networks: Network and basic components – Logical sequencing – Rules of network construction – Critical path analysis – Probability considerations in PERT – Distinction between PERT and CPM.

Text Book :

[1] KantiSwarup, P.K Gupta,Manmohan, Operations Research, Sultan Chand Publishers,

New Delhi, 2005.

Unit - I : Chapter 2,3,4 Sections 2.1,2.2,3.1 to 3.5,3.6,4.1,4.3.
Unit - II : Chapter 4,5Sections 4.4, 5.1 to 5.4, 5.7, 5.9.
Unit - III : Chapter 10,11 Sections 10.1 to 10.3, 10.8,10.11,10.14,11.1 to 11.4.
Unit - IV : Chapter 17, Sections 17.1 to 17.7.
Unit - V : Chapter 21, Sections 21.1 to 21.7.

Reference Books :

[1]Prem Kumar Guptha and D.S. Hira, Operations Research: An Introduction, S.Chand and Co., Ltd. New Delhi,
[2] HamdyA.Taha, Operations Research (7^{th}Edn.) McMillan Publishing Company, New Delhi, 1982.

Course Outcomes:

At the end of the course the student will be able to

1. Understand the various techniques to solve Linear Programming Problems.
2. Acquire the knowledge about solving various optimization problems using standard methodology
3. Apply the Transportation and Assignment problem concepts in real life problems.
4. Solve the two person zero sum games based on games with and without saddle point
5. Solve the Network problems by using PERT & CPM Methods.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 6**
Part III : Core Paper XV	**No of credits : 4**

Title of the Paper: METHODS IN NUMERICAL ANALYSIS

Objectives:
1. To study about various numerical techniques.
2. To solve linear equations numerically and to find interpolation by using difference formulae.

Unit - I

Algebraic and Transcendental equations – Finding root of the given equation (Derivation of the formula not needed) using Bisection method – Method of False Position – Iteration method - Newton Raphson Method.

Unit - II

Finite differences – Forward, Backward and Central differences – Their symbolic relations – Newton's forward and backward difference interpolation formulae –Interpolation with unevenly spaced intervals – Application of Lagrange's interpolating polynomial (Proof not needed) – Divided differences and their properties – Application of Newton's General Interpolating formula (Proof not needed) – Inverse interpolation.

Unit - III

Numerical differentiation – Numerical Integration using Trapezoidal rule & Simpson's 1/3 rule, Simpson's 3/8 rule – Weddles's rules - Theory & problems.

Unit - IV

Solutions to linear Systems – Gaussian elimination and Gauss Jordan method – Jacobi & Gauss Siedal iterative methods – Theory & problems.

Unit - V

Numerical solution of ODE – Solution by Taylor series method, Picard's method, Euler's method, Modified Euler's method, RungeKutta 2^{nd} and 4^{th} order methods (Derivation of the formula not needed).

Text Book :

[1] S.S.Sastry, Introductory Methods of Numerical Analysis, Prentice Hall of India Pvt. Limited, New Delhi, 2006.

Unit - I : Chapter II, Sections 2.1 to 2.5

Unit -II : Chapter III, Sections 3.3, 3.3.1 to 3.3.4, 3.5,3.6,3.9, 3.9.1, 3.10,3.10.1,3.11.

Unit - III:Chapter V, Sections 5.1, 5.2, 5.4, 5.4.1 to 5.4.4.

Unit - IV: Chapter VI, Sections 6.3.2 to 6.3.4 , Chapter VIII, Sections 8.3.1, 8.3.2.

Unit - V : Chapter VII, Sections 7.1 to 7.4, 7.4.2, 7.5

Reference Books :

[1]S.Narayanan& Others, Numerical Analysis, S.Viswanathan Publishers, 1994.

[2] A.Singaravelu, Numerical Methods, Meenachi Agency, 2000.

Course outcomes:

At the end of the course the student will be able to

1. Acquire the basic knowledge of solving algebraic and transcendental equations.
2. Examine the relation between difference operators.
3. Evaluate integrals using numerical methods.
4. Solve linear system of equations using iterative and non-iterative methods
5. Find the numerical solution of ODE using various methods.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2
CO2	2	3	3	3	2
CO3	3	3	2	3	2
CO4	3	3	3	3	2
CO5	3	2	3	3	2

1-Low 2-Moderate 3- High

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Programme : B.Sc Mathematics	**Subject Code :**
Semester : III	**No of hours : 4**
Part III : Major Based Elective I	**No of credits : 4**

Title of the Paper: MECHANICS

Objectives:

1. To provide the basic knowledge of equilibrium of a particle.
2. To provide a basic knowledge of the behaviour of objects in motion.
3. To develop a working knowledge to handle practical problems.

Unit - I

Forces and Equilibrium: Newton's Law of motion – Resultant of two forces on a particle – Equilibrium of a particle under three or more forces.

Unit - II

Forces on a rigid body: Moment – Equivalent system of forces – Parallel forces – Forces along the sides of a triangle – Couples – Resultant of several coplanar forces.

Unit - III

Rectilinear Motion under varying forces: Simple harmonic motion – simple harmonic motion along a horizontal line – simple harmonic motion along a vertical line.

Unit - IV

Projectiles: Forces on a particle – Maximum height reached, range, time of flight – Projectile projected on a inclined plane – Enveloping parabola or bounding parabola.

Unit - V

Impact: Impulsive force – Impact of sphere – Impact of two smooth spheres – Impact of a smooth sphere on a plane – Oblique impact of two smooth spheres.

Text Book:

[1] P. Duraipandiyan, LaxmiDuraipandian&MuthamizhJayapragasam, Mechanics, S. Chand & Co., 2016.

Unit – I : Chapter 2: Sections 2.1, 2.2 and Chapter 3: Section 3.1
Unit – II : Chapter 4: Sections 4.1, 4.3 to 4.7
Unit – III : Chapter 12: Sections 12.1 to 12.3
Unit – IV : Chapter 13: Sections 13.1 to 13.3
Unit – V : Chapter 14: Sections 14.1 to 14.5

Reference Books :

[1]M.K.Venkataraman, Statics, Agasthiyar Publications, 2002.

[2] M.K. Venkataraman, Dynamics, Agasthiyar Book Dept, 1990.

Course Outcomes:

At the end of the course the student will be able to

1. Understand the Laws of Forces and their properties.
2. Understand Concepts of Moments and Couples, Equilibrium of Forces
3. Identify the simple harmonic motion of the particles on the universe
4. Acquire the knowledge about impulsive forces and its applications
5. Apply the concepts in real life situations

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : III	**No of hours : 4**
Part III : Major Based Elective I	**No of credits : 4**

Title of the Paper: FLUID DYNAMICS

Objectives:

1. To know the knowledge about fluid particles in steady and unsteady compressible and incompressible flows.
2. To provide the basic knowledge of two and three dimensional potential flows.
3. To apply the viscous flow in some real life situations.

Unit - I

Kinematics of fluid in motion: Real fluids and ideal fluids – Velocity of a fluid at a point – Streamlines and path lines; steady and unsteady flows – The velocity potential – The Vorticity vector – Local and particle rates of change – The equation of continuity – Worked examples – Acceleration of a fluid – Pressure at a point in a fluid at rest – Pressure at a point in moving fluid – Conditions at a boundary of two inviscid Immiscible fluids.

Unit - II

Equations of motion of a fluid: Euler's equations of motions – Bernoulli's equation – Worked examples – Some flows involving axial symmetry – Some special two – dimensional flows.

Some three – dimensional flows: Introduction – sources, sinks and doublets – Axi – symmetric flows; Stokes stream function.

Unit - III

Some two – dimensional flows: Meaning of a two – dimensional flow – Use of cylindrical polar coordinates – The stream function – The complex potential for two – dimensional, irrotational, incompressible flow – Complex velocity potentials for standard two dimensional flows – Some worked examples.

Unit - IV

Viscous flow: Stress components in real fluid – Relations between Cartesian components of stress - Translational motion of fluid element – The rate of strain quadric and principal stresses – Some further properties of the rate of strain quadric.

Unit - V

The coefficient of viscosity and Laminar flow – The Navier – Stokes equations of motions of a viscous fluid - Some solvable problems in viscous flow – Steady viscous flow in tubes of uniform crass section.

Text Book

[1**]** F.Charlton, Content and Treatment as in Text Book of Fluid Dynamics, CBS Publishers and Distributors, New Delhi, 1985.

Unit - I : Chapter II, Sections2.1 to 2.9 and
Chapter III, Sections 3.1 to 3.3
Unit - II :Chapter III, Sections 3.4 to 3.6, 3.9, 3.10
Chapter IV, Sections 4.1, 4.2, 4.5
Unit - III :Chapter V, Sections 5.1 to 5.6
Unit - IV : Chapter VIII, Sections 8.1to8.5
Unit - V : Chapter VIII, Sections 8.8 to 8.12 except 8.8.4

Course Outcomes:

At the end of the course the student will be able to
1. Analyse the behaviour of motion of Fluids
2. Apply of Projectile in practical problems.
3. Understand the concept of two – dimensional flow using cylindrical polar coordinates
4. Analyse the behaviour of various fluids in real life problems.
5. Know about Stokes equations of motions of a viscous fluid

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 4**
Part III : Major Based Elective II	**No of credits : 4**

Title of the Paper: PROGRAMMING IN C

Objectives:

1. To learn the basic structure, operators and statements of c language.
2. To learn the decision making statements and to solve the problems based on it.
3. To learn arrays, functions and solve the problems regarding about it.

Unit– I

Constants, Variables and Data Types: Character set – C tokens –Keywords and identifiers – Constants - Variables – Data types – Declaration of variables – Assigning values to variables – Defining symbolic constants.

Operators & Expressions:– Arithmetic, relational, logical, assignment, increment, decrement, conditional, bitwise,special operators - Evaluation of expressions – Some computational problems – Type conversions in expressions - Operator precedence and associativity – Mathematical functions – Managing input and output oprators.

Unit– II

Decision making and Branching: Use of IF, IF – ELSE & nesting of IF – ELSE statements - ELSE- IF ladder – Switch statement – Conditional operator – GOTO statement.

Decision making & looping: WHILE , DO and FOR statements.

Unit– III

Arrays: One dimensional , Two dimensional & Multi-dimensional arrays.

Handling of character strings: Declaration and initialisation – Arithmetic operations – Comparisons of two strings – String- handling functions.

Unit– IV

User defined functions: – The form of C functions - Return values & their types – Calling a function – Category of functions – No arguments & no return values – Arguments but no return values – Arguments with return values – Nesting of functions – Recursion – Functions & arrays – The scope & life time of variables in a function.

Unit– V

Structures and Unions: Defining a structure – Structure initialisation – Comparison - arrays of structures – Arrays within structures –Structures within structures - Structures and functions – Unions – Size of structure –Bit fields .

Text Book:

[1] E. Balagurusamy, Programming in ANCI C, Tata McGraw Hill Publishing Company Ltd 1992 (2nd Edition)

Unit– I: Chapter II , Chapter III and Chapter IV
Unit– II: Chapter V and Chapter VI (Except Section 6.5)
Unit–III : Chapter VII and Chapter VIII
Unit–IV: Chapter IX
Unit– V: Chapter X

Reference Books:

[1] Ashok N.Kamthane "Programming with Ansi and Turbo C", Pearson Education publishers, 2002
[2] Byron Gottfried "Programming with C"(Schaum's outline series)-Tata McGrawHill publishing company -1998.

Course Outcomes:

At the end of the course the student will be able to

1. Acquire complete knowledge of C language Students
2. Develop logics which will help them to create programs, applications in C.
3. Understand the concept of various user defined function of C language
4. Learn the basic programming constructs they can easily switch over to any other language in future.
5. Write C programme using the concept of structures based on user defined functions.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2019 – 2020 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 4**
Part III : Major Based Elective II	**No of credits : 4**

Title of the Paper: PROGRAMMING IN C++ with OOP

Objectives:

1. To learn class structure, member functions & data members.
2. To learn the concept of inheritance, types and example problems.
3. To learn the concepts of polymorphism, types and problems.
4. To learn files, streams and Exception handling & Templates with practical problems.

Unit– I

Beginning with C++: Applications of C++ - Simple C++ program – Structure of C++ program – Creating the source file – compiling and linking – Tokens, Expressions and Controls structures: Tokens – keywords – Identifiers – Basic data types: User defined data types – derived data types – symbolic constant – type compatibility – declaration of variables – Initialization of variables – reference variables.

Unit–II

Operators in C++: Scope resolution operator – member differencing operator – memory management operator – Manipulators – Type coast Operator – Expressions, special assignment expressions – implicit conversions – operator overloading – operator precedence – control structures. Functions in C++: Introduction – main function – Functions prototyping call by reference – inline function, default arguments – constant arguments – return by reference – function overloading – friend and virtual functions.

Unit– III

Class and object: Specifying a class – defining member functions – C structures revisited – A C++ program with class – arrays with in a class – static member function – arrays of objects – returning objects – constant member functions – pointers of members.

Unit– IV

Constructors and Destructors: Introduction – constructors – parameterized constructors – Multiple constructors in a class – copy constructors – dynamic constructor – constructing Two – dimensional arrays - Destructors – defining operator over loading – manipulation strings using operators – type conversions.

Unit– V

Inheritance: Extending classes – introduction – defining derived class – single inheritance – making a private member inheritance – multiple, multilevel, hierarichal, hybrid inheritance – virtual base classes – abstract classes – constructors in derived classes – member classes: nesting of classes.

Text Book:

1. E. Balagurusamy, Object oriented programming with C++, Tata McGraw Hill publishers Ltd. New Delhi 1995.

Unit - I : Chapter 2: Section 2.1 – 2.3, 2.6 – 2.8 and Chapter 3: Section 3.1 – 3.12
Unit – II : Chapter 3: Section 3.13 – 3.21 and Chapter 4: Section 4.1 – 4.10
Unit – III : Chapter 5: Section 5.1 – 5.5, 5.9, 5.12, 5.13 – 5.18
Unit – IV : Chapter 6: Section 6.1 – 6.4, 6.7 – 6.9, 6.11 and Chapter 7: Section 7.2, 7.6, 7.8
Unit – V : Chapter 8: Section 8.1 – 8.12

Reference Books:

[1] S.K.Chadha, Object Oriented Programming using C++", AmitChadhaKalyani Publishers, New Delhi, 2001-2002.
[2] Ashok N.Kamthane, "Object Oriented Programming with Ansi and Turbo C++", Pearson Education publishers, 2003.

Course Outcomes:

At the end of the course the student will be able to

1. Acquire complete knowledge of C language Students
2. Develop logics which will help them to create programs, applications in C ++.
3. Learn the basic programming constructs they can easily switch over to any other language in future.
4. Write a programme using class function.
5. Learn various types of inheritance for effective preparation of C++ programmes.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 4**
Part III : Major Based Elective III	**No of credits : 4**

Title of the Paper: DISCRETE MATHEMATICS

Objectives:

1. To study about the concept of Connectives and Inference calculus.
2. To gain knowledge about Lattices and Boolean Algebra.

Unit - I

Connectives, statements formulae, equivalence of statement formulae, functionally complete set of connectives –NAND and NOR connectives, implication, principal conjunctive and disjunctive normal forms.

Unit - II

Inference calculus – Derivation process – Conditional proof – Indirect method of proof – Automatic theorem proving – Predicate calculus.

Unit - III

Partial ordering – Lattices – Properties – Lattices as algebraic system – Sub lattices – Direct product and homomorphism – Special lattices- Complemented and distributive lattices.

Unit - IV

Boolean Algebra – Sub algebra – Direct product and homomorphism – Boolean expression and Boolean functions – Re-presentation and Minimization of Boolean functions.

Unit - V

Combinatorics: The rules of sum and product – Permutations – Combinations – Binomial theorem – Multinomial theorem – Well ordering principle – Mathematical induction.

Text Books:

[1] J.P Tremblay and R.Manohar, Discrete Mathematical Structures with Application to Computer Sciences, Tata McGraw – Hill publishing company Pvt Ltd, New Delhi, 1997. (Units I to IV)
[2] G.Ramesh and C.Ganesamoorthy, Discrete Mathematics,HI – Tech Publications,2003. (Unit V)

Unit - I : Chapter I, Sections 1.2, 1.3 [1]
Unit -II : Chapter I, Sections 1.4, 1.5, 1.6 [1]
Unit - III : Chapter IV, Sections 4.1 [1]
Unit - IV : Chapter IV, Sections 4.2 to 4.4 [1]
Unit - V : Chapter III, Sections 3.1 to 3.26 [2]

Reference Books

[1] Kenneth H . Rosen, Discrete Mathematics and its applications, Fifth edition, Tata Mc Graw Hill Publishing Company Pvt.Ltd, New Delhi,2003.

[2] C.L Liu, Elements of Discrete Mathematics, Second Edition, MC- Graw Hill Book company, New york, 1998.

Course Outcomes:

At the end of the course the student will be able to

1. Create and verify the validity of the statements
2. Know and understand about partially ordered sets, Boolean algebra, lattices and their types
3. Apply Karnaugh map for simplifying the Boolean expression
4. Demonstrate the skill to construct simple mathematical proofs and to validate
5. understand the concept of permutation and combination and its related theorems

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 4**
Part III : Major Based Elective III	**No of credits : 4**

Title of the Paper: AUTOMATA THEORY

Objectives:
1. To know the basic knowledge of Automata in various models.
2. To develop the automata for various formal languages.

Unit – I

Theory of Automata – Definition of an automaton – Description of a finite automaton – Transition system – Properties of transition functions –Acceptability of a string by a finite automaton – Non deterministic finite state machine – The equivalence of DFA and NDFA – Mealy and Moore models – Minimisation of finite automata.

Unit – II

Formal language – Basic definition and examples – Chomsky classification of languages – Language and their relation – Recursive and recursively Enumerable sets – Operations on languages – Languages and automata.

Unit – III

Regular sets and regular grammars – Regular expression – Finite automaton and regular expressions – Pumping lemma for regular sets.

Unit – IV

Context – free languages – Context – free languages and derivation trees – Ambiguity in context – free grammars – Simplification of context – free grammars – Normal forms for context – free grammars – Chomsky normal form – Greibach normal form – Simple problems.

Unit – V

Turing Machines and Linear Bounded Automata – Turing Machines Model – Representation of Turing Machines – Language Acceptability by Turing Machines – Design of Turing Machines – Description of Turing Machines.

Text Book:

[1] K.L.P.Mishra and N.Chandrasekaran, Theory of Computer Science (Automata, Languages and Computation), Prentice Hall of India Private Ltd., Third Edition, New Delhi.

Unit – I : Chapter 3: (Sec. 3.1 – 3.9)
Unit – II : Chapter 4: (Sec.4.1 – 4.6)
Unit – III : Chapter 5: (Sec.5.1 – 5.3)
Unit –IV : Chapter 6: (Sec.6.1– 6.4)
Unit – V : Chapter 9: (Sec.9.1 – 9.5)

Reference Books :

[1] Rani Siromoney, Formal Languages and Automata, Second edition, The Christian Literature Society, Madras,1984.

Course Outcomes:

At the end of the course the student will be able to

1. Explore the theoretical foundations of computer science from the perspective of formal languages and classify machines by their power to recognize languages.
2. Differentiate regular, context-free and recursively enumerable languages.
3. Gain the knowledge of basic kinds of finite automata and their capabilities.
4. Understand the concept of Turing Machines Model and to solve the related problems.
5. Define the regular sets and Pumping lemma for regular sets.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 4**
Part III : Major Based Elective -IV	**No of credits : 4**

Title of the Paper: ASTRONOMY

Objectives:

1. To introduce the existing world of astronomy to students.

2. To help the students to know about the celestial objects.

3. To gain knowledge about astronomical concepts through mandatory.

Unit – I

Spherical Trigonometry- Celestial Sphere.

Unit – II

The Earth – Zones of Earth – Terrestrial Latitudes and Longitudes – Radius of Earth – Rotation of Earth – Dip of Horizon.

Unit – III

Refraction – Laws of refraction – Tangent formula for refraction – General effects of refraction – Horizontal refraction.

Unit – IV

Time – Equation of time – seasons – calendar – conversion of time.

Unit – V

The moon – Introduction – Sidereal month – Elongation – Phase of moon – Lunar liberations – Full moon – Path of the moon – Position of the moon – Lunar day and Lunar time – Earth shine.

Text Book:

S. Kumaravelu and SusheelaKumaravelu, Astronomy for Degree Classes, SKV Publishers, Nagarkovil, 2004.

Unit I : Chapters I and II
Unit II : Chapter III: Section 3.1 to 3.5
Unit III : Chapter IV
Unit IV : Chapter VII
Unit V : Chapter XII

Reference books :

1. V. Thiruvenkatacharya, A text book of Astronomy, S. Chand & Co. Pvt. Ltd., 1972.
2. H. Kartunen, Fundamental Astronomy, Content Technologies Publications, 2013.

Course Outcomes:

At the end of the course the student will be able to

1. Understand the effects of refractions geocentric parallax.
2. Compile solar and lunar ellipses.
3. Understand Kepler's laws of planetary motion.
4. Understand the variation in duration of day and night in various zones of earth.
5. Analyse the physical system of Moon.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : VI	**No of hours : 4**
Part III : Major Based Elective -IV	**No of credits : 4**

Title of the Paper: MATHEMATICAL METHODS

Objectives :

1.To enhance basic skills in the areas of recurrence relations and difference equations
2. To enable the students to learn about Z-Transforms and its inverse
3. To know and apply the Fourier Transforms

Unit - I

Recurrence relations and Generating function: Recurrence – An introduction – Polynomials and their evaluations – Recurrence relations – Generating function – Solution of finite order homogeneous (linear) relations – Solution of non-homogeneous relations.

Unit - II

Difference Equations: Difference equation – Definition – Formation of Linear difference equations – Complementary function – Particular integral – Solution of difference equations.

Unit - III

The Z - Transform: Z - Transform – Definition – Elementary properties – Initial and final value theorems - Convolution theorem – Problems.

Unit - IV

Inverse Z - Transform: Inverse Z - Transform – Partial fraction method – Residue method – Power series method - Using Convolution –Solution of difference equations using Z - Transform.

Unit - V

Fourier Transforms: Fourier Transforms – Definition – Integral transforms – Properties of Fourier Transforms – Parseval's Identity Convolution theorem – Infinite Fourier Sine and Cosine Transforms – Simple problems.

Text Books :

[1] M.K.Venkatraman,N.Sridharan and N.Chandrasekaran, Discrete Mathematics, The National Publishing Company, Chennai, 2000. (Unit - I)

[2] P.Kandasamy, K.Thilagavathy and K.Gunavathi, Numerical Nethods, S.Chand& Company Ltd., New Delhi, Reprint, 2010. (Unit – II)

[3] A.Singaravelu, Engineering Mathematics III, Meenakshi Agency, Chennai, Revised Edition 2008. (Units – III, IV,V).

Unit – I: Chapter 5, Section 1 to 5. [1]
Unit – II: Chapter 10 [2]
Unit – III : Chapter 5 (5.1 to 5.37) [3]
Unit –IV : Chapter 5 (5.38 to 5.89) [3]
Unit –V : Chapter 4 (4.18 to 4.83) [3]

ReferenceBooks :

[1] Koleman and Bushy, Discrete Mathematical Structures, Prentice Hall of India, New Delhi, 2009.

[2] P.Kandasamy, K.Thilagavathy and K.Gunavathi, Mathematics Volume IV: Vector Calculus, Fourier Series and Fourier Transforms, S. Chand & Company Ltd., New Delhi, 2008.

[3] B.S.Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 2005.

Course Outcomes:

At the end of the course the student will be able to
1. Solve the linear finite order relations using generating functons
2. Understand how to solve the difference equations using the Z-Transforms
3. Acquire the knowledge of Fourier Transforms.
4. Find the Fourier sine and cosine transformations of functions
5. To obtain knowledge about the various properties of Fourier transformations

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Zoology	**Subject Code :**
Semester : III	**No of hours : 2**
Part IV : Non Major Elective - I	**No of credits :2**

Title of the Paper: FUNDAMENTALS OF MATHEMATICAL STATISTICS- I

Unit – I

Classification and tabulation of data: Introduction – Data and its collection – Classification of data – Purpose, advantages and types of classification of data – Variable – Tabulation of data – Objectives, rules and types of tables – Difference between classification and tabulation – Essential parts of a statistical table – Format of a table – Sorting – Presentation of data – Frequency distribution – Bi-Variate frequency distribution.

Unit - II

Diagrammatic and Graphic presentation of data: Introduction – Graphical representation of statistical data –Diagramatic presentation of data – Types of diagrams – Line, Bar diagram – Two-dimensional diagrams – Pie diagram – Pictograph – Difference between diagram and graph – Types of graph – Line graph – Graph of two or more variables – Range, net balance, band graph – Histogram – Frequency polygon.

Unit - III

Measures of Central Tendency: Features of a good average – Arithmetic mean– Methods to calculate arithmetic mean(direct method only) – Median – Calculation of median – Merits, demerits and uses of median – Mode – Types of model series – Computation of mode – Merits, demerits and uses of mode – Geometric mean – Merits, demerits and uses of geometric mean – Harmonic mean – Merits, demerits and uses of harmonic mean – Relation between A.M, G.M and H.M.

Text Book :

[1] P.N.Arora, SumeetArora and S.Arora, Comprehensive Statistical Methods, S.Chand and

Sons, New Delhi, 2007.

Unit -I:Chapter II, Sections 2.1 to 2.3, 2.5, 2.6, 2.8, 2.9, 2.11 to 2.20, 2.26
Unit -II:Chapter III, Sections 3.1 to 3.9, 3.12 to 3.18, 3.24, 3.25.
Unit -III:Chapter IV, Sect4.1 to 4.3, 4.5.1 to 4.5.3, 4.10 to 4.12, 4.14 to 4.17, 4.20 to 4.24

Course outcomes:

At the end of the course the student will be able to

1. Gain the knowledge of data collection.
2. Know about the frequency distribution.

3. Getting the knowledge of various types of diagrams.
4. Understand the concept of mean, median, mode.
5. Know about merits, demerits and uses of various types of means.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Zoology **Subject Code :**
Semester : IV **No of hours : 2**
Part IV : Non Major Elective - II **No of credits :2**

Title of the Paper: FUNDAMENTALS OF MATHEMATICAL STATISTICS - II

Unit - I

Correlation Analysis: Introduction - Concept of correlations – Coefficient of correlation – Types of correlation – Scatter diagram – Karl Pearson's coefficient of correlation –Spearman's rank correlation.

Unit - II

Regression Analysis: Introduction **–** Types, Lines of regressions–Regression coefficients– Properties of regression coefficients– Properties of linear regressions – Method of least squares – Derivations of the lines of regressions directly from data, actual means and assumed means – Relation between regression and correlation analysis.

Unit - III

Chi – Square distribution: Introduction – Chi – Square distribution – Applications of Chi – Square distribution: Inferences about a population variance – Goodness of fit test – Test of independence of attributes-contingency tables.

Text Book :

[1] P.N.Arora, SumeetArora and S.Arora, Comprehensive Statistical Methods, S.Chand and Sons, New Delhi, 2007.

Unit - I : Chapter 7, Sections 7.1 to 7.3, 7.6, 7.8 to 7.10.
Unit - II :Chapter 8, Sections 8.1 to 8.10, 8.14.
Unit - III : Chapter 15, Sections 15.1, 15.3, 15.6.1, 15.6.2, 15.6.3.

Course outcomes:

At the end of the course the student will be able to

1. Gain the knowledge of various types of correlations.
2. Know about rank correlation.
3. Getting knowledge of regression concepts.
4. Understand the relation between regression and correlation analysis.
5. Understand the concept of Chi – Square distribution.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2
CO2	2	3	3	3	2
CO3	3	3	2	3	2
CO4	3	3	3	3	2
CO5	3	2	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics **Subject Code :**
Semester : II **No of hours : 2**
Part IV : Skill Based Elective - I **No of credits : 2**

Title of the Paper: FUNDAMENTALS OF COMPUTER

Unit – I

Introduction – History of Computer – Generations of computer – Classification of Computer – Advantages and disadvantages – Computer Basic Architecture .

Unit- II

Basic components of computer system: Control unit – Input output unit – Memory – RAM – ROM – Memory – Types and devices – Peripherals.

Unit – III

Software – System software – Application software – Hardware – Printer – Scanners – Limitations of computers – Terminology.

Text Book :

[1] V.RameshBabu, R.Samyuktha, Computer Practice, VRB Publishers, 2002.

Reference Books :

[1] GhoshDastidar, Chattopadhyay and Sarkar, Computers and Computation - A Beginner's Guide, Prentice Hall of India, 1999.

[2] Taxali, PC Software for Windows Made Simple, Tata McGraw Hill, 1999.

Course Outcomes:

At the end of the course the student will be able to
1. Acquire complete knowledge of classification of computer.
2. Know Computer Basic Architecture
3. Understand the concept of various memory.
4. Know about software and hardware.
5. Understand the limitations of computers.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : IV	**No of hours : 2**
Part IV : Skill Based Elective - II	**No of credits : 2**

Title of the Paper: WINDOWS OPERATING SYSTEM

Unit - I

Windows basics: Starting windows – Windows desktop – Using the mouse – Task bar and start menu – Structure of a window – Moving a window – Maximizing, minimizing and restoring – Resizing a window – Arranging icons – Using help menu.

Unit - II

My computer – Windows explorer – Control panel: Changing date and time – Customising our mouse –Changing the display characteristics – Multimedia control panel – Customising sound – Fonts – Regional settings – Modems.

Unit - III

Working with programs: Start – Exit – Adding and removing programs – Managing files and folders – Printers – Windows accessories.

Text Book :

[1]V.RameshBabu, R.Samyuktha, Computer Practice, VRB Publishers, 2002.

Reference Books :

[1] Silberschatz , Galvin, GAGNE "Operating System Concepts" , Sixth edition, John wile and Sons,INC, 2002.
[2] D.M.Dhamdhere, "Operating Systems", Tata McGraw Hill, 2002.

Course Outcomes:

At the end of the course the student will be able to
1. Acquire knowledge of windows, mouse, taskbar.
2. Know about how to use help menu.
3. Understand about windows explorer.

4. Know about control panel.
5. Understand the windows accessories.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics **Subject Code :**
Semester : V **No of hours : 2**
Part IV : Skill Based Elective - III **No of credits : 2**

Title of the Paper: MS- WORD

UNIT-I

Introduction to MS-Word, Starting ms –word, Parts of the word screen, menus in ms-word, Toolbars in Ms – word, working with documents, selecting text, moving and copying text,inserting the auto text, finding and replacing text, deleting text.

UNIT – II

Formatting documents, working with tabs, tables and columns, other tools in word.

UNIT – III

Working with styles, working with macros, working with templates, working with graphics, Mail merge, Printing a document.

Text Book :

[1] V.RameshBabu, R.Samyuktha, Computer Practice, VRB Publishers, 2002.

Reference Books :

[1] David Rivers, Word 2003, 2004, Essential Training [MOV], Lynda.com, Inc Publications.
[2] Jill Murphy, 2003, Microsoft Office Word- Comprehensive Course - Labyrinth Publications.
[3] McGraw-Hill/Irwin - Deborah Hinkle, 2003, Microsoft Office Word 2003:
[4] A Professional Approach, Comprehensive Student Edition Specialist Student Edition.

Course Outcomes:

At the end of the course the student will be able to
1. Acquire knowledge of toolbars in Ms – word.
2. Know about how to work with documents.
3. Understand about working with tabs, tables and columns.
4. Understand about working with graphics.

5. Know to print a document.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	3	2
CO2	2	3	3	3	2
CO3	3	3	2	3	2
CO4	3	3	3	3	2
CO5	3	2	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Mathematics	**Subject Code :**
Semester : V	**No of hours : 2**
Part IV : Skill Based Elective - IV	**No of credits : 2**

Title of the Paper: M.S –EXCEL AND POWER POINT

UNIT – I

Introduction to M.s Excel , Starting M.s excel, Parts of spread sheet, working with worksheet, formatting work sheets

UNIT - II

working with workbooks, functions and formulasFunctions – working with excel graphics, Macros in excel, printing a work sheet

UNIT – III

Starting power point, opening new presentation, Parts of power point, creating slides setting a background layout, savings and closing power point, opening existing presentation, deleting slides, inserting objects, adding headers and footers, drawing tools.

Text Book :

[1] V.RameshBabu, R.Samyuktha, Computer Practice, VRB Publishers, 2002.

Reference Books :

1. NellaiKannan. C (2002), MS-Office, Nels Publications, Tamil Nadu.

2. Sundararajan.K, 2005, Internet, Netcape Communicator 4.7, Kannadasan Pathipagam, Chennai.

3. Ellen Finkelstein, 2003, How to Do Everything with Microsoft Office PowerPoint 2003 (How to Do Everything) Published by McGraw-Hill Osborne Media.

Course Outcomes:

At the end of the course the student will be able to

1. Acquire knowledge about Ms – excel.
2. Know about how to work wth worksheet.

3. Understand about working with excel graphics.
4. Understand about Parts of power point.
5. Know to add headers and footers.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Physics / B.Sc Chemistry | **Subject Code :**
Semester : I / III | **No of hours : 5/4**
Part III : Allied Course - I | **No of credits : 3**

Title of the Paper: CALCULUS AND LAPLACE TRANSFORMS

Unit - I

Successive differentiation – n^{th} derivative of standard functions (Derivation not needed) simple problems only – Leibnitz theorem (proof not needed) simple problems in all these.

Unit - II

Integrals of the form by using trigonometric substitutions

1) $\int \frac{dx}{\sqrt{a^2-x^2}}$ 2) $\int \frac{dx}{\sqrt{a^2+x^2}}$ 3) $\int \frac{dx}{\sqrt{x^2-a^2}}$ 4) $\int \frac{dx}{a^2-x^2}$ 5) $\int \frac{dx}{x^2-a^2}$ 6) $\int \frac{dx}{a^2+x^2}$

7) $\int \sqrt{a^2-x^2}\,dx$ 8) $\int \sqrt{a^2+x^2}\,dx$ 9) $\int \sqrt{x^2-a^2}\,dx$

Integrals of the form

1) $\int_a^b \frac{dx}{\sqrt{(x-a)(b-x)}}$ 2) $\int_a^b \sqrt{(x-a)(b-x)}dx$ 3) $\int_a^b \sqrt{\frac{x-a}{b-x}}dx$

Unit - III

Evaluation of integrals of types

1) $\int \frac{dx}{ax^2+bx+c}$ 2) $\int \frac{px+q}{ax^2+bx+c}dx$ 3) $\int \sqrt{ax^2+bx+c}dx$ 4) $\int \frac{dx}{\sqrt{ax^2+bx+c}}$

5) $\int \frac{px+q}{\sqrt{ax^2+bx+c}}dx$ 6) $\int \frac{dx}{a+b\cos x}$ 7) $\int \frac{dx}{a+b\sin x}$ 8) $\int \frac{dx}{a\cos x+b\sin x}$

Unit - IV

Reduction formula (when n is a positive integer) for

1) $\int \sin^n x\,dx$ 2) $\int_0^{\frac{\pi}{2}} \sin^n x\,dx$ 3) $\int \cos^n x\,dx$ 4) $\int_0^{\frac{\pi}{2}} \cos^n x\,dx$

5) Without proof $\int_0^{\frac{\pi}{2}} \sin^n x \cos^m x\,dx$ - and illustrations 6) $\int \tan^n x\,dx$ 7) $\int_0^{\frac{\pi}{4}} \tan^n x\,dx.$

Unit - V

Laplace Transforms – Definitions – Properties – Simple Problems.

Text Books :

[1] A. Singaravelu, Allied Mathematics – I, A.R Publications, 2002. (Units I to IV)

[2] T.K.ManickavasagamPillai&S.Narayanan, Calculus Vol.III, S.V.Publication, 2011. (Unit V)

Unit - I: Chapter I, Sections 1.1 to 1.23.[1]
Unit -II:Chapter III, Sections 3.12 to 3.24, 3.65 to 3.67.[1]
Unit - III: Chapter III, Sections 3.45 to 3.59, 3.68 to 3.73.[1]
Unit - IV: Chapter III, Sections 3.86 to 3.99, 3.101 to 3.103. [1]
Unit -V: Chapter V, Sections 1, 2, 4, 5 [2]

Course outcomes:

At the end of the course the student will be able to

1. Understand the properties of higher derivatives
2. Know about integrals of the form by using trigonometric substitutions
3. Understand some more types of integrals.
4. Know about reduction formulas.
5. Understand the concept of laplace transforms.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme	**: B.Sc Physics / B.Sc Chemistry**	**Subject Code :**	
Semester	**: II / IV**	**No of hours**	**: 6 / 5**
Part III	**: Allied Course - II**	**No of credits**	**: 4**

Title of the Paper: ANALYTICAL GEOMEMTRY(3D), ALGEBRA AND TRIGONOMETRY

Unit - I

Standard equation of a plane – Intercept form – Normal form – Plane passing through given points – Angle between planes – Plane through the line of intersection of two planes – Equation of the straight line – Shortest distance between two skew lines – Equation of the line shortest distance – Simple problems only.

Unit – II

Sphere – Standard equation – Sphere passing through a given circle – Intersection of two spheres.

Unit - III

Symmetric, Skew-Symmetric, Orthogonal, Hermitian, Skew-Hermitian, Unitary matrices (Properties not included)– Rank of matrices – Characteristic equation, Eigen values, Eigen vectors – Cayley Hamilton's Theorem (Proof not needed) –Simple problems only.

Unit - IV

Expansion of sin nθ,cosnθ, tan nθ,(n being a positive integer) – Expansion of sin $^{n}\theta$,cos$^{n}\theta$,sin $^{n}\theta$,cos$^{m}\theta$ in a series of sines and cosines of multiples of θ **(**θ – given in radians) – Expansion of sin θ, cos θ and tan θ in terms of powers of θ (only problems in all the above).

Unit - V

Euler's formula for $e^{i\theta}$– Definition of Hyperbolic functions – Expansion of inverse hyperbolic functions $\sinh^{-1}x$, $\cosh^{-1}x$ and$\tanh^{-1}x$– Separation of real and imaginary parts of sin(x+iy), cos (x+iy), tan(x+iy), sinh(x+iy), cosh(x+iy), tanh(x+iy) – Simple problems.

Text Books :

[1]T.K.ManickavasagamPillai&T.Natarajan, Analytical Geometry, S.V.Publication, 1985, Revised Edition.(Unit-I &II)

[2] A. Singaravelu, Allied Mathematics (Paper – II), A.R Publications, 2003.(Unit-III, IV, V)

Unit - I:Chapter II – Sections 1 to 11,
Chapter III – Sections 1 to 8

Unit -II : Chapter IV – Sections 1 to 8,

Unit -III: Chapter II –Sections 2.1 to 2.40 (Excluding Properties)
Chapter II–Sections 2.51 to 2.66, 2.75 to 2.80.

Unit - IV: Chapter IV – Sections 4.7 to 4.32.(Only Problems)

Unit-V:Chapter V – Sections 5.1 to 5.17.

Course outcomes:

At the end of the course the student will be able to

1. Illustrate the knowledge of geometry and its applications
2. Formulate the equations of line, plane and sphere.
3. Understand the concept of matrices.
4. Understand the concept of trigonometry.
5. Perceive the difference between trigonometric function and hyperbolic functions

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.Sc Physics / B.Sc Chemistry	**Subject Code :**
Semester : II / IV	**No of hours : 5**
Part III : Allied Course - III	**No of credits : 3**

Title of the Paper: VECTOR CALCULUS, FOURIER SERIES AND NUMERICAL METHODS

Unit - I

Scalar and Vector, Vector differentiation – velocity & acceleration Vectors – Gradient and its properties - directional derivative – unit normal vector – scalar Potential.

Unit – II

Divergence , Curl – Solinoidal and irrotational vectors - Double operators- properties connecting gradient, divergence, and curl of a vector(simple properties only).

Unit – III

Fourier series: Periodic function, Continuous function, Fourier series, even and odd functions.

Unit - IV

Algebraic and transcendental equations – Finding root of the given equation (Derivation of the formula not needed) using Bisection method, Method of false position, Iteration method and Newton Raphson method (simple problems only)

Unit - V

Numerical Integration using Trapezoidal rule & Simpson's First and second rules , Weddle's rule - Simple problem (Proofs not needed)

Text Books :

[1] A.Singaravelu,Allied Mathematics (Paper I) ,A.R Publications,2002. (Units I, II)
[2] A.Singaravelu,Allied Mathematics (Paper III) ,A.R Publications,2003. (Unit III)
[3]S.S Sastry, Introductory methods of Numerical Analysis, 4^{th} edition. (Units IV, V)

Unit - I: Chapter V Sections5.1 to 5.10, 5.20 to 5.36 [1]
Unit - II : Chapter V Sections 5.37 to 5.55 [1] (Simple Properties only)
Unit -III:Chapter IV Sections 4.2 -4.27 [2]
Unit -IV:Chapter IISections , 2.2 ,2.3, 2.4, 2.5.[3] (Problems only)
Unit - V:Chapter V Sections 5.4.1 to 5.4.4 [3]

Course outcomes:

At the end of the course the student will be able to

1. Perceive the knowledge of vector differentiation and vector integration.
2. Formulate the relationship between gradient, divergence and curl
3. Determine the Fourier expansion of functions
4. Acquire the basic knowledge of solving algebraic and transcendental equations.
5. Evaluate integrals using numerical methods.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
of the Tamil Nadu HR & CE Department
Department of Mathematics
(For those who are joining in 2022 – 2023 and after)

Programme : B.C.A	**Subject Code :**
Semester : I	**No of hours : 5**
Part III : Allied Course - I	**No of credits : 3**

Title of the Paper: NUMERICAL ANALYSIS

Unit - I

Algebraic and transcendental equations – Finding a root of the given equation (Derivation of the formula not needed) using Bisection method – Method of false position – Newton Rapson method – Iteration method.

Unit - II

Finite differences forward – Backward differences – Newton's forward and backward difference interpolation Formulae. Lagrange's interpolating polynomial. (Proof not needed);

Unit - III

Numerical differentiation – Numerical Integration using Trapezoidal rule &Simpson's 1/3 rule, Simpson's 3/8 rule – Simple problems.

Unit - IV

Solutions to linear systems – Gaussian Elimination Method – Jacobi and Gauss Siedal methods – Simple problems.

Unit - V

Numerical solution of O.D.E: Solution by Taylor series method, Euler's method, Modified Euler's method,Runge-kutta $2^{nd}$and 4^{th}order methods – Simple problems only.

Text Book :

[1] S.S Sastry, Introductory methods of Numerical Analysis, Prentice Hall of India Pvt Ltd, 2005.

Unit-I: Chapter 2, Sections 2.1 to2.5.
Unit -II: Chapter 3, Sections 3.3,3.3.1,3.3.2,3.6,3.9.1.
Unit - III: Chapter 5 – Sections 5.4,5.4.1,5.4.2,5.4.3
Unit - IV: Chapter 6, Section 6.3.2 and Chapter 8, Sections8.3.1,8.3.2.
Unit - V : Chapter 7 – Sections 7.2,7.4,7.4.2, 7.5.

Reference Books :

[1]S.Narayanan& Others, Numerical Analysis, S.Viswanathan Publishers, 1994.
[2]A.Singaravelu, Numerical Methods, Meenachi Agency, June 2000.

Course outcomes:

At the end of the course the student will be able to

1. Acquire the basic knowledge of solving algebraic and transcendental equations.
2. Examine the relation between difference operators.
3. Evaluate integrals using numerical methods.
4. Solve linear system of equations using iterative and non-iterative methods
5. Find the numerical solution of ODE using various methods.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
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Programme : B.C.A	**Subject Code :**
Semester : II	**No of hours : 5**
Part III : Allied Course - II	**No of credits : 3**

Title of the Paper: OPERATIONS RESEARCH

UNIT – I

Operations Research: Introduction – Basic concepts Linear programming problem- Mathematical Formulation of the problem – Graphical solution method.

UNIT – II

Simplex method: Introduction – canonical and standard forms of L.P.P.– the Simplex procedure – BIG – M Method only. (simple problems).

UNIT – III

Sequencing problems: Processing of n jobs through two machines – Processing of n jobs through k machines – Processing of two jobs through m machines.

UNIT – IV

Transportation problem: Introduction _General transportation problem – the transportation table –solution of a transportation problem – finding an initial Basic feasible solution (NWC, LCM, VAM) – Degeneracy in transportation problem – Transportation Algorithm (modi method) – unbalanced Transportation problem .

UNIT – V

Network scheduling by PERT /CPM: Introduction _ network and Basic components – logical sequencing rules of network construction – critical path analysis – probability considerations in PERT- Distinction between PERT and CPM.

Text Book :

[1] KantiSwarup, P.K Gupta andMan Mohan, Operations Research, Sultan Chand and sons,

New Delhi, 2005.

Unit I: Chapter 2, Chapter 3, Sections 3.1 to 3.3
Unit II: Chapter 3, Sectios 3.4, 3.5, Chapter 4, Sections 4.1, 4.3, 4.4 (Big – M method only).
Unit III: Chapter 12, Sections 12.1 to 12.6.
Unit IV: Chapter 10, Sections 10.9 to 10.12, 10.14.
Unit V : Chapter 21, Sections 21.1 to 21.7.

Reference Books :

[1]Prem Kumar Guptha and D.S. Hira, Operations Research: An Introduction, S.Chand and Co., Ltd. New Delhi,

[2] HamdyA.Taha, Operations Research (7^{th}Edn.) McMillan Publishing Company, New Delhi, 1982.

Course Outcomes:

At the end of the course the student will be able to

1. Understand the various techniques to solve Linear Programming Problems.
2. Acquire the knowledge about solving various optimization problems using standard methodology
3. Know about sequencing problems.
4. Apply the Transportation and Assignment problem concepts in real life problems.
5. Solve the Network problems by using PERT & CPM Methods.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
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Programme : B.A.ECONOMICS	**Subject Code :**
Semester : III	**No of hours : 4**
Part III : Allied Course - I	**No of credits : 3**

Title of the Paper: STATISTICAL METHODS – I

Unit - I

Introduction–Statistics – Nature and Scope – its relation with other sciences – Limitation – collection of data – Primary and secondary sources.

Unit - II

Sampling–Essentials of sampling – probability and Non – probability sampling methods – Merits and limitations of sampling.

Unit - III

Types of Diagram – bar and pie diagrams – Pictographs – graphs Histogram – Frequency polygon-problems – limitations of diagrams and graphs.

Unit - IV

Measures of Central Value–Arithmetic mean for raw data and frequency distribution – Limitations – Mode and its limitations – Median and its limitations. (mean, median and mode problems only)

Unit - V

Quartile – properties of Geometric mean – Harmonic mean – simple problems.(Quartile, geometric mean and harmonic mean problems only)

Text Book :

[1] P.R Vittal,Business Mathematics and Statistics,Margham publications, Chennai,2008.

Unit - I: Part Two Chapter I and Chapter II
Unit - II: Part Two Chapter XVIII
Unit - III: Part Two Chapter IV
Unit - IV: Part Two Chapter V(Mean,median and mode problems only)
Unit - V: Part Two Chapter V (Quartile,geometric mean and harmonic mean only)

Reference Books :

[1] Gupta, S.C, Fundamentals of Applied Statistics, S.Chand& Sons, New Delhi, 1993.
[2] Gupta, S.C, Statistical Methods, Sultan Chand, New Delhi, 2002.

[3] Speigal, M.R, Theory and Problems of Statistics, McGraw Hill Book Co., London, 1992.
[4] Chou, Y, Statistics Analysis, Holt, Reinhart and Winston, New York, 1975.

Course outcomes:

At the end of the course the student will be able to

1. Gain the knowledge of data collection.
2. Know about sampling..
3. Getting the knowledge of various types of diagrams.
4. Understand the concept of mean, median, mode.
5. Know about merits, demerits and uses of various types of means.

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High

POOMPUHAR COLLEGE (AUTONOMOUS)
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Department of Mathematics
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Programme : B.A.ECONOMICS	**Subject Code :**
Semester : IV	**No of hours : 5**
Part III : Allied Course - II	**No of credits : 4**

Title of the Paper:STATISTICS PRACTICAL

1.Classification and Tabulation of Statistical Data

2. Diagrammatic and Graphical representation of Statistical Data

3. Measures of Central Tendency

4. Measures of Dispersion

5. Correlation and Regression

6. Time Series

A record of lab work should be maintained and submitted at the time of the practical examinations.

Signature of the Subject Experts: **Signature of the HOD**

POOMPUHAR COLLEGE (AUTONOMOUS)
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Programme : B.A.ECONOMICS	**Subject Code :**
Semester : IV	**No of hours : 5**
Part III : Allied Course - III	**No of credits : 3**

Title of the Paper: STATISTICAL METHODS – II

UNIT - I

Tabulation of data: Frequency distribution – Its formation – Types of tables.

UNIT - II

Correlation Analysis: Types of correlations – Scatter diagram – Pearson's coefficient of correlations – Direct Method – Spearman's rank correlation.(Problems only)

UNIT - III

Regression Analysis: Difference between correlation and regression analysis – Two Regression lines – Regression coefficients.

UNIT - IV

Index Numbers: Uses of Index numbers – Problems in the construction of index numbers – Quantity index numbers – Laspeyers, Passche formula. (Problems only)

UNIT - V

Interpolation: Newton's Forward and backward interpolation formula – Lagrange's interpolation formula – Simple problems only.

Text Books :

[1] P.R Vittal,Business Mathematics and Statistics,Margham publications, Chennai,2008.
[2] S.S Sastry, Introductory methods of Numerical Analysis, Prentice Hall of India Pvt Ltd, 2005.

Unit - I: Part Two Chapter III [1]
Unit - II: Part Two Chapter VIII (Problems only) [1]
Unit - III: Part Two Chapter IX
Unit - IV: Part Two Chapter XIII (Problems only) [1]
Unit - V : Chapter III Sections 3.6, 3.9.1 (Problems only) [2]

Reference Books :

[1] Gupta, S.C, Fundamentals of Applied Statistics, S.Chand& Sons, New Delhi, 1993.

[2] Gupta, S.C, Statistical Methods, Sultan Chand, New Delhi, 2002.
[3] Speigal, M.R, Theory and Problems of Statistics, McGraw Hill Book Co., London, 1992.
[4] R.S.N.Pillai, V.Bagavathi, Statistics, S,Chand and Company Ltd, 1993.

Course outcomes:

At the end of the course the student will be able to

1. Gain the knowledge of tabulation of data.
2. Know about the correlation.
3. Getting the knowledge of regression.
4. Understand the uses of index numbers.
5. Know about the relation between difference operators..

Signature of the Subject Experts: **Signature of the HOD**

Outcome Mapping:

CO / PO	PO1	PO2	PO3	PO4	PO5
CO1	3	3	3	2	2
CO2	3	2	3	3	2
CO3	3	3	3	3	2
CO4	3	3	3	3	2
CO5	2	3	3	3	2

1-Low 2-Moderate 3- High