CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

(Nationally Re-accredited (III cycle) with 'A' (CGPA 3.41 out of 4)

Grade by NAAC

PG AND RESEARCH DEPARTMENT OF MATHEMATICS

B.Sc MATHEMATICS SYLLABUS

2021-2022 ONWARDS

CAUVERY COLLEGE FOR WOMEN (AUTONOMOUS)

PG AND RESEARCH DEPARTMENT OF MATHEMATICS

B.Sc MATHEMATICS

PROGRAMME OUTCOMES

PO1	Demonstrate basic manipulative skills in algebra, geometry and trigonometry.
PO2	Communicate mathematical principles and ideas with clarity and coherence, both written and verbally, demonstrating communication skills to be used in any future career.
PO3	Demonstrate proficiency in linear algebra, real and complex analysis as well as areas of modern, proof-based Mathematics.
PO4	Compute limits and derivatives using their definitions, and use the fundamental theorem of calculus to compute definite and indefinite integrals.
PO5	Construct counter examples to mathematical statements and understand the importance of hypotheses into a viable career path.

CAUVERY COLLEGE FOR WOMEN(AUTONOMOUS)
PG AND RESEARCH DEPARTMENT OF MATHEMATICS
B.Sc MATHEMATICS COURSE STRUCTURE
(For the candidates admitted in the year 2021-2022)

Sem	Part	Course	Course Title	Course Code	Ins. Hrs	Credit	Exam Hours	Marks Int	Marks Ext	Total
I	I	Language Course – I (LC) – Tamil*/Other Languages +#	Ikkala Ilakkiyam / Story, Novel, History of Hindi Literature-I &Grammar – 1 / History of Popular Tales Literature and Sanskrit Story / Communication in French –I	19ULT1/ 19ULH1/ 19ULS1/ 19ULF1	6	3	3	25	75	100
	II	English Language Course - I (ELC)	Functional Grammar for Effective Communication –I	19UE1	6	3	3	25	75	100
	III	Core Course – I (CC)	Differential Calculus and Trigonometry	19UMA1CC1	5	5	3	25	75	100
		Core Course – II (CC)	Integral Calculus and Fourier Series	19UMA1CC2	6	6	3	25	75	100
		First Allied Course – I (AC)	Mathematical Statistics – I	19UMA1AC1	5	3	3	25	75	100
	IV	UGC Jeevan Kaushal Life skills	Universal Human Values	20UGVE	2	2	3	25	75	100
				TOTAL	**30**	**22**	**-**	**-**	**-**	**600**

Sem	Part	Course	Course Title	Course Code	Ins. Hrs	Credit	Exam Hpurs	Marks		Total
								Int	Ext	
II	I	Language Course – II (LC) - Tamil*/Other Languages +#	Idaikala Ilakkiyamum Pudhinamum Prose, Drama, History of Hindi Literature –II & Grammar - 2 Poetry, Textual Grammar and Alakara Communication in French –II	19ULT2/ 19ULH2/ 19ULS2/ 19ULF2	6	3	3	25	75	100
	II	English Language Course – II(ELC)	Functional Grammar for Effective Communication –II	19UE2	6	3	3	25	75	100
	III	Core Course – III (CC)	Analytical Geometry and Vector Calculus	20UMA2CC3	6	6	3	25	75	100
		First Allied Course – II (AP)	Mathematical Statistics- II (Practical)	19UMA2AC1P	5	3	3	40	60	100
		First Allied Course – III (AC)	Mathematical Statistics-III	19UMA2AC2	5	3	3	25	75	100
	IV	Environmental Studies	Environmental Studies	21UGES	2	2	3	25	75	100
	V	**Extra Credit Course**	**Swayam Online Course**	**To be fixed Later**	**As Per UGC Recommendations**					
				TOTAL	**30**	**20**	**-**	**-**	**-**	**600**

Sem	Part	Course	Course Title	Course Code	Ins. Hrs	Credit	Exam Hours	Marks Int	Marks Ext	Total
III	I	Language Course – III (LC) – Tamil*/Other Languages +#	Kappiyamum Naadagamum Medieval, Modern Poem, Poetics & History of Hindi Literature – 3 Prose, Textual Grammar and Vakyarachana Communication in French –III	19ULT3/ 19ULH3/ 19ULS3/ 19ULF3	6	3	3	25	75	100
	II	English Language Course - III(ELC)	Reading and Writing For Effective Communication- I	19UE3	6	3	3	25	75	100
	III	Core Course – IV CC)	Differential Equations and Laplace Transforms	19UMA3CC4	5	5	3	25	75	100
		Core Course – V (CC)	Classical Algebra and Theory of Equations	19UMA3CC5	5	5	3	25	75	100
		Second Allied Course – I (AC)	Python Programming	21UMA3AC3	4	4	3	25	75	100
		Second Allied Course – II (AP)	Python Programming LAB	21UMA3AC2P	2	2	3	40	60	100
	IV	Non Major Elective I – for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil up to 10th, +2 but opt for other languages in degree programme	Mathematics for competitive Examinations-I	19UMA3NME1	2	2	3	25	75	100
			Basic Tamil	19ULC3BT1						
			Special Tamil	19ULC3ST1						
	V	**Extra Credit Course**	**Swayam Online Course**	**To be fixed Later**	**As Per UGC Recommendations**					
			TOTAL		**30**	**24**	**-**	**-**	**-**	**700**

Sem	Part	Course	Course Title	Course Code	Ins. Hrs	Credit	Exam Hours	Marks		Total
								Int	Ext	
IV	I	Language Course – IV(LC) - Tamil*/Other Languages +#	Pandaiya Ilakkiyam Letter Writing, Precise Writing, General Essays, Technical Terms, Proverbs, Amplifications, Idioms & Phrases, History of Hindi Literature – 4 Drama, History of Drama Literature Communication in French –IV	19ULT4/ 19ULH4/ 19ULS4/ 19ULF4	6	3	3	25	75	100
	II	English Language Course – IV(ELC)	Reading and Writing For Effective Communication- II	19UE4	6	3	3	25	75	100
	III	Core Course – VI (CC)	Sequences and Series	19UMA4CC6	6	5	3	25	75	100
		Core Course – VII (CC)	Methods in Numerical Analysis	19UMA5CC10-R	4	3	3	25	75	100
		Second Allied Course – III (AC)	Internet of Things	21UMA4AC4	4	3	3	25	75	100
		Skill Based Elective-I (SBE)	Introduction to R	19UMA5SBE1A-R	2	2	3	40	60	100
			Introduction to Statistical Tools and Techniques – SPSS	19UMA5SBE1B-R						
	IV	Non Major Elective II – for those who studied Tamil under Part I a) Basic Tamil for other language students b) Special Tamil for those who studied Tamil up to10th, +2 but opt for other languages in degree programme	Mathematics for competitive Examinations-II	19UMA4NME2	2	2	3	25	75	100
			Basic Tamil	19ULC4BT2						
			Special Tamil	19ULC4ST2						
	V	**Extra Credit Course**	**Swayam Online Course**	**To be fixed Later**	**As Per UGC Recommendations**					
			TOTAL		**30**	**21**	**-**	**-**	**-**	**700**

Sem	Part	Course	Course Title	Course Code	Ins. Hrs	Credit	Exam Hours	Marks		Total
								Int	Ext.	
V	III	Core Course – VIII (CC)	Abstract Algebra	19UMA5CC7	6	5	3	25	75	100
		Core Course – IX (CC)	Real Analysis	19UMA5CC8	5	5	3	25	75	100
		Core Course – X (CC)	Statics	19UMA5CC9	5	4	3	25	75	100
		Major Based Elective-I	Discrete Mathematics	19UMA4MBE1A-R	4	3	3	25	75	100
			Automata Theory	19UMA4MBE1B-R						
			Essentials of Data Science	21UMA5MBE1C						
		Major Based Elective- II	Fuzzy Set Theory and its Applications	21UMA5MBE2A	4	3	3	25	75	100
			Astronomy	19UMA6MBE3B-R						
			Artificial Intelligence	21UMA5MBE2C						
	IV	Skill Based Elective-II	Statistical Tools and Techniques – R Programming (Practical)	19UMA5SBE2AP	2	2	3	40	60	100
			Statistical Tools and Techniques – SPSS (Practical)	19UMA5SBE2BP						
		Skill Based Elective -III	LaTeX (Practical)	19UMA6SBE3AP-R	2	2	3	40	60	100
			Numerical methods with MATLAB Programming (Practical)	21UMA5SBE3BP						
		UGC Jeevan Kaushal Life Skills	**Professional Skills**	**19UGPS**	**2**	**2**	**3**	**25**	**75**	**100**
	V	**Extra credit course**	**Swayam Online Course**	**To be fixed Later**	**As per UGC Recommendations**					
	TOTAL				**30**	**26**	**-**	**-**	**-**	**800**

Sem	Part	Course	Course Title	Course Code	Ins. Hrs	Credit	Exam Hours	Marks		Total
								Int	Ext.	
VI	III	Core Course – XI (CC)	Linear Algebra	19UMA6CC11	5	5	3	25	75	100
		Core Course – XII (CC)	Complex Analysis	19UMA6CC12	6	5	3	25	75	100
		Core Course – III (CC)	Dynamics	19UMA6CC13	5	5	3	25	75	100
		Core Course – XIV (CC)	Operations Research	19UMA6CC14	5	4	3	25	75	100
		Major Based Elective-III	Graph Theory	19UMA6MBE2A-R	4	3	3	25	75	100
			Mathematical Modelling	21UMA6MBE3B						
			Fundamentals of Big Data Analytics	21UMA6MBE3C						
		Major Based Elective-IV	Probability and Queuing Theory	21UMA6MBE4A	4	3	3	25	75	100
			Number Theory	19UMA6MBE2B-R						
			Web Technology	21UMA6MBE4C						
	V	Extension Activities	Extension Activities		-	1	-	-	-	-
		Gender Studies	Gender Studies	19UGGS	1	1	3	25	75	100
	TOTAL				**30**	**27**	**-**	**-**	**-**	**700**
	GRAND TOTAL				**180**	**140**	**-**	**-**	**-**	**4100**

List of Allied Courses

Group I (Any one)	**Group II (Any one)**
1. Physics	1. Chemistry
2. Mathematical Statistics	2. Computer Science
3. Financial Accounting	3. Management Accounting

Language Part – I	-	4	
English Part –II	-	4	
Core Paper	-	14	
Allied Paper	-	4	
Allied Practical	-	2	
Non-Major Elective	-	2	
Skill Based Elective	-	3	
Major Based Elective	-	4	
Environmental Studies	-	1	
Universal Human Values	-	1	
Professional Skills	-	1	
Gender Studies	-	1	
Extension Activities	-	1	(Credit only)

➢For those who studied Tamil up to 10^{th}, +2 (Regular Stream)

\+ Syllabus for other Languages should be on par with Tamil at degree level

those who studied Tamil up to 10^{th},+2 but opt for other languages in degree level under Part I should study special Tamil in Part IV

** Extension Activities shall be outside instruction hours

Non Major Elective I & II – for those who studied Tamil under Part I

a) Basic Tamil I & II for other language students
b) Special Tamil I & II for those who studied Tamil up to 10^{th} or +2 but opt for other languages in degree programme

Note:

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

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

FOR THEORY

The passing minimum for CIA shall be 40% out of 25 marks [i.e. 10 marks]

The passing minimum for University Examinations shall be 40% out of 75 marks [i.e. 30 marks]

FOR PRACTICAL

The passing minimum for CIA shall be 40% out of 40 marks [i.e. 16 marks]

The passing minimum for University Examinations shall be 40% out of 60 marks [i.e. 24 marks]

CORE COURSE-I (CC)

DIFFERENTIAL CALCULUS AND TRIGONOMETRY

2019-2020 Onwards

Semester - I	DIFFERENTIAL CALCULUS AND TRIGONOMETRY	Hours/Week – 5	
CORE COURSE-I		Credits – 5	
Course Code – 19UMA1CC1		Internal 25	External 75

Objectives:

- To inculcate the basics of differentiation and their applications.
- To introduce the notion of curvature, Evolutes and Involutes in polar co-ordinates.
- To understand the basic concepts of Trigonometry.

Course Outcome:

On the Successful completion of the course the student would be able to

CO Number	CO Statement	Knowledge Level
CO1	Explain the basic concepts of differentiation, extreme functions of two variables.	**K3**
CO2	Apply the concept of differentiation for explaining curvature.	**K3**
CO3	Distinguish the trigonometric functions, related problems.	**K3**
CO4	Associate various types of hyperbolic and inverse hyperbolic functions and Solve problems in summation of trigonometric series.	**K4**
CO5	Examine the conceptual understanding and fluency with trigonometric functions, techniques and manipulations necessary for success in calculus.	**K4**

Mapping with Programme Outcomes:

COs/POs	PO1	PO2	PO3	PO4	PO5
CO1	S	M	S	S	S
CO2	M	S	S	M	S
CO3	S	S	M	M	S
CO4	S	S	M	M	S
CO5	M	M	S	S	M

S-Strong, M-Medium, L-Low

CORE COURSE-I (CC)

DIFFERENTIAL CALCULUS AND TRIGONOMETRY

SYLLABUS

UNIT I

Successive Differentiation: The n^{th} derivative – Standard results – Trigonometrical transformation – Formation of equations involving derivatives – Leibnitz formula for the n^{th} derivative of a product – A complete formal proof by induction.

Meaning of the Derivative: Geometrical interpretation – Meaning of the sign of the differential coefficient. Maxima and Minima of functions of two variables.

UNIT II

Curvature – Circle, radius and centre of curvature – Cartesian formula for the radius of curvature – The coordinates of the centre of curvature – Evolute and Involute - Radius of curvature when the curve is given in polar coordinates.

UNIT III

Expansions of cos nθ and sin nθ – Expansion of tan nθ in powers of tan θ – Expansion of tan(A + B + C + …) (omitting examples on formation of equations) - Powers of sines and cosines of θ in terms of functions of multiples of θ – Expansion of $\sin^n \theta$ and $\cos^n \theta$ when n is a positive integer– Expansions of sin θ and cos θ in a series of ascending powers of θ.

UNIT IV

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

UNIT V

Logarithms of complex quantities - To find the logarithm of x + iy – General value of logarithm of x + iy – Summation of Trigonometrical Series – Method of differences – Some of series of n angles in arithmetic progression – Sum of cosines of n angles in arithmetic progression – Gregory's series.

TEXT BOOKS:

S.No	Authors Name	Title of the Book	Publishers Name	Year of Publication
1.	S. Narayanan, T. K.Manicavachagom Pillay	Calculus, Volume I	S. Viswanathan (Printer & publishers), Pvt Ltd	2015
2.	S. Narayanan, T. K.Manicavachagom Pillay	Trigonometry	S. Viswanathan (Printer & publishers), Pvt Ltd	2013

CHAPTERS AND SECTIONS:

UNIT	CHAPTER	SECTIONS
I	3 4 8	1.1 – 1.6 [1] 2.1 & 2.2 [1] 4 & 4.1[1]
II	10	2.1 - 2.6 [1]
III	3	1, 2, 3, 4, 4.1, 5 & 5.1 [2]
IV	4	1, 2, 2.1 - 2.3 [2]
V	5 6	5, 5.1, 5.2 [2] 1, 2, 3.1 [2]

REFERENCE BOOKS:

S.No	Authors Name	Title of the book	Publishers Name	Year of Publication
1.	S. Arumugam and Issac	Calculus, Volume I	New Gamma Publishing House	1991
2.	S. Narayanan, T.K. Manichavasagam Pillai	Trigonometry	S. Viswanathan Pvt Limited and Vijay Nicole Imprints Pvt Limited	2004
3.	A.Singaravelu and R.Rama	Differential Calculus and Trigonometry	R publications, Nagapattinam	2003

Pedagogy:

Power point presentation, Group Discussion, Seminar, Quiz, Assignment.

CORE COURSE-II (CC)

INTEGRAL CALCULUS AND FOURIER SERIES

2019-2020 Onwards

Semester - I		**Hours/Week – 6**	
CORE COURSE-II	**INTEGRAL CALCULUS AND FOURIER SERIES**	**Credits – 5**	
Course Code – 19UMA1CC2		**Internal**	**External**
		25	**75**

Objectives:

- To inculcate the basics of Integration and their applications.
- To introduce the order of Integration, Triple Integrals, Beta and Gamma functions.
- To understand the basic concepts of Fourier series.

Course Outcomes:

On the successful completion of the course, students will be able to

CO Number	**CO Statement**	**Knowledge Level**
CO1	Apply the concepts of double, triple integrals.	**K3**
CO2	Distinguish the concepts of Beta and Gamma functions.	**K3**
CO3	Apply the concepts of half range Fourier series for solving problems necessary for success in calculus.	**K3**
CO4	Associate various types of Fourier series for solving problems.	**K4**
CO5	Evaluate the types of integration**.**	**K5**

Mapping with Programme Outcomes:

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	M	S	S	S
CO2	M	S	S	S	S
CO3	S	S	M	M	S
CO4	S	S	M	M	S
CO5	S	M	S	S	M

S - Strong, M - Medium, L - Low

CORE COURSE-II (CC)

INTEGRAL CALCULUS AND FOURIER SERIES

SYLLABUS

UNIT I

Integration: Integration of rational algebraic functions $\int \frac{lx+m}{ax^2+bx+c}dx$ - Integration of Irrational functions $\int \frac{px+q}{\sqrt{ax^2+bx+c}}dx$ - Any expression of the form $\int \frac{dx}{(x-k)\sqrt{ax^2+bx+c}}$ - $\int \frac{dx}{a+b\cos x}$ (Integration of these types only)

UNIT II

Multiple Integrals: Definition of the double integral - Evaluation of the double Integral- Triple Integrals.

UNIT III

Improper Integrals: Beta and Gamma functions: Definitions - convergence of $\Gamma(n)$ - Recurrence formula of gamma functions - Properties of Beta functions - Relation between Beta and Gamma functions -Definite integrals using Gamma functions.

UNIT IV

Fourier Series- Definition - Fourier Series expansion of periodic functions with period 2π - Even and Odd functions.

UNIT V

Half-Range Fourier Series - Definition - Development in cosine series and sine series – Change of Interval - Combination of Series.

TEXT BOOKS:

S.No	Authors Name	Title of the Book	Publishers Name	Year of Publication
1.	S. Narayanan, T.K.Manicavachagam Pillai.	Calculus Vol II	S. Viswanathan (Printer & publishers), Pvt Ltd	2015
2.	S. Narayanan, T.K.Manicavachagam Pillai.	Calculus Vol III	S. Viswanathan (Printer & publishers), Pvt Ltd	2014

CHAPTERS AND SECTIONS:

UNIT	CHAPTER	SECTIONS
I	7 8 9	7.3 (Type II)[1] Case II and case V[1] Full [1]
II	5	2.1, 2.2 & 4 [1]
III	7	2.1-2.3, 3 to 5 [1]
IV	6	1, 2, 3 [2]
V	6	4, 5.1, 5.2, 6, 7 [2]

REFERENCE BOOKS:

S.No	Authors Name	Title of the book	Publishers Name	Year of Publication
1.	Shanti Narayan	Integral Calculus	S.Chand & Company Ltd	2002
2.	Shanti Narayan & P.K.Mittal	Integral Calculus	S.Chand & Company Ltd	2008
3.	U.P.Singh, R.J.Srivastava & N.H.Siddiqui	Integral Calculus	Wistom Press	2011
4.	J.K.Goyal & K.P.Gupta	Laplace and Fourier Transforms	Pragati Prakashan	2009

Pedagogy:

Power point presentation, Group Discussion, Seminar, Quiz, Assignment.

FIRST ALLIED COURSE-I (AC)

MATHEMATICAL STATISTICS – I

2019-2020 Onwards

Semester – I		**Hours/Week – 5**	
FIRST ALLIED COURSE-I	**MATHEMATICAL STATISTICS – I**	**Credits – 3**	
Course Code – 19UMA1AC1		**Internal**	**External**
		25	**75**

Objectives:

- To learn the basic concepts of statistics.
- To learn the basic ideas of statistical tools.

Course Outcomes:

On the successful completion of the course, students will be able to

CO Number	**CO Statement**	**Knowledge Level**
CO1	Describe the concept of probability theory and identify applications in real situations.	**K2**
CO2	Explain the derivation of moment generating function, characteristic function, probability generating function and the proof of Chebychev's inequality with its applications.	**K2**
CO3	Compute the index numbers by different types of methods.	**K3**
CO4	Define and Classify the two dimensional random variables.	**K3**
CO5	Interpret the various properties of expectation, variance and The concept of covariance.	**K3**
CO6	Distinguish between a discrete and a continuous random variable.	**K4**

Mapping with Programme Outcomes:

COs/ POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO2	S	S	S	S	S
CO3	S	S	M	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S
CO6	S	S	S	S	S

S- Strong; M-Medium; L-Low

FIRST ALLIED COURSE-I (AC)

MATHEMATICAL STATISTICS – I

SYLLABUS

UNIT I

Theory of probability : Introduction – Short History – Definitions of Various Terms – Mathematical or Classical or 'a Priori' Probability – Statistical or Empirical Probability – Mathematical Tools: Preliminary Notion of sets – Sets and Elements of Sets – Operations on Sets – Algebra of Sets - Axiomatic approach to Probability – Random Experiment (Sample Space) – Event – Some Illustrations – Algebra of Events – Probability : Mathematical Notion – Probability Function – Laws of Addition of Probabilities – Extension of General Law of Addition of Probabilities – Law of Multiplication or Theorem of Compound Probability – Extension of Multiplication Law of Probability – Independent Events – Pair wise Independent Events – Mutually Independent Events – Baye's theorem.

UNIT-II

Random Variables and Distribution Functions : Random Variable – Distribution Functions – Properties of Distribution Function – Discrete Random Variable – Probability Mass Function – Discrete Distribution Function – Continuous Random Variable – Probability Density Function – Various Measures of Central Tendency, Dispersion, Skewness and Kurtosis for Continuous Probability Distribution Function – Continuous Distribution Function – Joint Probability Mass Function and Marginal and Conditional Probability Function – Joint Probability Distribution Function – Joint Density Function, Marginal Density Function - Independent Random Variables – The Conditional Distribution Function and Conditional Probability Density Function.

UNIT-III

Mathematical Expectation – Addition Theorem of Expectation – Multiplication Theorem of Expectation – Co-variance – Expectation of a Linear Combination of Random Variables – Variance of a Linear Combination of Random Variables – Expectation of a Continuous random variable – Conditional Expectation and Conditional Variance.

UNIT-IV

Moment Generating Function – Theorems on moment Generating Functions–

Cumulants– Additive Property of Cumulants – Effect of Change of Origin and Scale of Cumulants – Characteristic Function – Properties of Characteristic Functions – Uniqueness Theorem of Characteristic Functions – Chebychev's Inequality – Weak Law of Large Numbers– Bernoulli's Law of Large Numbers.

UNIT-V

Index numbers : Introduction – Meaning – Definition – Characteristics – Uses – Types of Index Numbers – Problems in the Construction of Index Numbers – Choice of Formula – Notations – Unweighted Index Numbers – Weighted Index Numbers – Quantity Index Numbers – Test of Consistency of Index numbers – Chain Base Method – Conversion of Chain Index into Fixed Index – Base Shifting – Splicing two Index Number Series – Deflating Index Numbers – Consumer Price Index – Meaning and Need – Uses – Construction of Consumer Price Index – Method of Constructing Consumer Price Index numbers – Aggregate Expenditure method – Family Budget method – Limitations of Index Numbers.

TEXT BOOKS:

S.No	Authors Name	Title of the Book	Publishers Name	Year of Publication
1.	S.C.Gupta & V.K.Kapoor	Elements Of Mathematical Statistics	Sultan Chand & Sons, New Delhi	2004
2.	R.S.N.Pillai & Bhagavathi	Statistics, Theory And Practice	S.Chand & Sons, New Delhi	2008

CHAPTERS AND SECTIONS:

UNIT	CHAPTER	SECTIONS
I	4	4.1 to 4.8 [1]
II	5	5.1 to 5.5.5 [1]
III	6	6.1 to 6.8 [1]
IV	6	6.9 to 6.13.1 [1]
V	14	Full [2]

REFERENCE BOOKS:

S.No	Authors Name	Title of the book	Publishers Name	Year of Publication
1.	S.C.Gupta & V.K.Kapoor	Fundamentals Of Mathematical Statistics	Sultan Chand & Sons.	2015
2.	T.Veerarajan	Probability, Statistics And Random Processes	Tata McGraw Hill education Private Limited	2010
3.	G.S.S.Bhisma Rao	Probability And Statistics	Scitech Publications (India) Pvt. Ltd	2011

Pedagogy:

Power point presentation, Group Discussion, Seminar, Quiz, Assignment.

CORE COURSE-III (CC)

ANALYTICAL GEOMETRY AND VECTOR CALCULUS

2020-2021 Onwards

Semester – II	**ANALYTICAL GEOMETRY AND VECTOR CALCULUS**	**Hours/Week – 6**	
CORE COURSE-III		**Credits – 5**	
Course Code – 20UMA2CC3		**Internal**	**External**
		25	**75**

Objectives:

- To understand the concepts and properties of analytical geometry.
- To understand the concepts of plane, straight line and sphere.
- To familiarize the students with the principles and practices of vector calculus.
- To familiarize the students with vector integration.

Course Outcome:

On the Successful completion of the course the student would be able to

CO Number	**CO Statement**	**Knowledge Level**
CO1	Explain the coordinates in space, equation of a plane.	**K3**
CO2	Describe the concepts of straight lines and coplanar lines.	**K3**
CO3	Classify the equation of a sphere and tangent planes.	**K3**
CO4	Solve the problems of Gauss Divergence Theorem, Stokes Theorem- Green's Theorem.	**K3**
CO5	Examine the concepts of vector integration for finding scalar potential.	**K4**

Mapping with Programme Outcomes:

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	M	S	S	S
CO2	M	S	S	S	S
CO3	S	S	M	M	S
CO4	S	S	M	M	M
CO5	S	S	S	S	M

S-Strong, M-Medium, L-Low

CORE COURSE-III (CC)

ANALYTICAL GEOMETRY AND VECTOR CALCULUS

SYLLABUS

UNIT I:

Coordinate System: Introduction-Rectangular Cartesian Coordinates-Distance between two Points-Direction Cosines.

Planes: Equation of a Plane – Angle Between two Planes – Angle Bisectors of two Planes.

UNIT II:

Straight Lines: Equation of a Straight Line – A Plane and a Line – Equations of Two Skew Lines in a Simple form.

The Sphere: Introduction – Equation of a Sphere – Tangent Line and Tangent Plane – Section of a Sphere.

UNIT III:

Vector Differentiation: Introduction – Vector Algebra- Differentiation of Vectors – Gradient - Divergence and Curl.

UNIT IV:

Vector Integration - Line integrals-Normal Surface Integral $\int_S \vec{F}.\hat{n}dS$ -Flux across a Surface-Volume Integral $\int_V F.dv$

UNIT V:

Gauss's Divergence Theorem $\int_S \vec{F}.\hat{n}dS = \int_V div\,\vec{F}dv$ -Stoke's theorem $\int_C \vec{F}.\hat{n}d\vec{r} = \int_S curl\,\vec{F}.\,\hat{n}dS$ -Green's theorem-Stoke's theorem in space- Stoke's theorem in Cartesian form.

TEXT BOOKS:

S.No	Authors Name	Title of the Book	Publishers Name	Year of Publication
1.	S. Arumugam and A. Thangapandi Isaac	Analytical Geometry 3D & Vector Calculus	New Gamma Publishing House, 2011	2011
2.	M.L.Khanna	Vector Calculus	Jai Prakash Nath and Co.,	2002

CHAPTERS AND SECTIONS:

UNIT	CHAPTER	SECTIONS
I	I	1.0 - 1.3 [1]
	II	2.1 - 2.3[1]
II	III	3.1 - 3.3 [1]
	IV	4.0 - 4.3 [1]
III	V	5.0 - 5.4 [1]
IV	III	1 – 4 [2]
V	III	5 – 8 [2]

REFERENCE BOOKS:

S.No	Authors Name	Title of the book	Publishers Name	Year of Publication
1.	P.Duraipandiyan, Lakshmi Duraipandian and D.Muhilan	Analytical Geometry Three dimensionsal	Emerald Publishers	1984
2.	H.D.Pandey, M.Q.Khan and B.N.Gupta	A Text Book of Analytical Geometry and Vector Analysis	Wisdom Press	2011
3.	P.Duraipandiyan and Lakshmi Duraipandian	Vector Analysis	Emerald Publishers	1986

Pedagogy:

Power point presentation, Group Discussion, Seminar, Quiz, Assignment.

FIRST ALLIED COURSE – II (AC)

MATHEMATICAL STATISTICS – II (PRACTICAL)

2019-2020 Onwards

Semester – II	**MATHEMATICAL STATISTICS – II (PRACTICAL)**	**Hours/Week – 5**	
FIRST ALLIED COURSE-II		**Credits – 3**	
Course Code – 19UMA2AC1P		**Internal 40**	**External 60**

Objectives:

- To analyze the statistical problems.
- To provide the knowledge to interpret and solve the statistical problems.
- To ensure with the ideas of statistical tools.

Course Outcome:

On the Successful completion of the course the student would be able to

CO Number	**CO Statement**	**Knowledge Level**
CO1	Identify the discrete and continuous data and find average through the Measures of Central Tendency and Measures of Dispersion.	**K1**
CO2	Solve the problems in joint, Marginal and Conditional Probability distributions involving two random variables.	**K2**
CO3	Explain the various methods of finding Correlation and Regression co-efficient between two data sets and their applications.	**K2**
CO4	Describe and illustrate the concepts of fitting probability distributions.	**K2**
CO5	Analyze the concepts of testing of hypothesis and apply the test to the real life problems.	**K3**

Mapping with Programme Outcomes:

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	S	S	S	S
CO2	M	S	M	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S-Strong, M-Medium, L-Low

FIRST ALLIED COURSE – II (AC)

MATHEMATICAL STATISTICS – II (PRACTICAL)

SYLLABUS

UNIT I

Measures of central tendency: Arithmetic Mean – Median – Quartiles – Deciles – Percentiles – Mode – Geometric Mean – Harmonic Mean – Measures of Dispersion: Range and Quartile Deviation – Mean Deviation – Standard Deviation –Co-efficient of variation – Skewness – Moments – Kurtosis.

UNIT II

Karl Pearson's Coefficient of Correlation – Rank correlation – Regression.

UNIT III

Theoretical Distributions: Binomial Distribution – Poisson Distribution – Normal Distribution.

UNIT IV

Two-dimensional Random Variables – Two-dimensional or Joint Probability Mass Function – Two-dimensional Distribution Function – Marginal Distribution Function – Joint Density Function, Marginal Density Function – The Conditional Distribution Function and Conditional Probability Density Function (Problems only).

UNIT V

Tests of Hypotheses: Test of Significance for Large Samples – Test of significance of the difference between sample proportion and population proportion – Test of significance of the difference between two sample proportions – Test of significance of the difference between sample mean and population mean – Test of significance of the difference between the mean two samples – Test of significance of the difference between sample S.D. and population S.D.– Test of significance of the difference between S.D.'s of two large samples – Test of Significance for small Samples : Tests of significance based on t-test for Mean – F-test for Variance - Chi-square test for goodness of fit and independence of attributes (Problems only).

TEXT BOOKS:

S.No	Authors Name	Title of the Book	Publishers Name	Year of Publication
1.	R.S.N. Pillai and Bagavathi.	Practical Statistics	Sultan Chand & Sons.	2008
2.	S.C.Gupta & V.K.Kapoor	Fundamentals Of Mathematical Statistics	Sultan Chand & Sons.	2015
3.	T.Veerarajan	Probability, Statistics And Random Processes	Tata McGraw Hill education Private Limited	2010

CHAPTERS AND SECTIONS:

UNIT	CHAPTER	SECTIONS
I	3 , 4 , 5	FULL [1]
II	6 , 7	FULL [1]
III	13	FULL [1]
IV	5	5.5, 5.5.1-5.5.5 [2]
V	9	FULL [3]

REFERENCE BOOKS:

S.No	Authors Name	Title of the book	Publishers Name	Year of Publication
1.	R.S.N.Pillai & Bhagavathi	Statistics, Theory And Practice	S.Chand & Sons	2008
2.	V.Rajagopalan	Selected Statistical Tools	New Age International (P) Ltd Publishers	2006
3.	G.S.S.Bhisma Rao	Probability and Statistics	Scitech Publications (India) Private Limited, New Delhi	2011

Pedagogy:

Power point presentation, Group Discussion, Seminar, Quiz, Assignment.

LIST OF PROGRAMS:

1) Arithmetic Mean, Geometric Mean and Harmonic Mean.
2) Median and Mode.
3) Quartile Deviation and Mean Deviation.
4) Standard Deviation and Co-efficient of Variation.
5) Karl Pearson's Co-efficient of Skewness.
6) Bowley's Co-efficient of Skewness.
7) Moments and Kurtosis.
8) Karl Pearson's Co-efficient of correlation.
9) Rank Correlation.
10) Fit a regression line.
11) Fit a Binomial distribution.
12) Fit a Poisson distribution.
13) Fit a Normal distribution.
14) Marginal and conditional distribution for X and Y.
15) Mathematical Expectation for X and Y.
16) Test the hypothesis of the difference between two sample means.
17) Test the hypothesis for single proportion.
18) Test the significance of hypothesis using't' test.
19) Test the significance of hypothesis using 'F' test.
20) Test the significance of hypothesis using chi-square test.

FIRST ALLIED COURSE – III (AC)

MATHEMATICAL STATISTICS – III

2019-2020 Onwards

Semester – II	**MATHEMATICAL STATISTICS – III**	**Hours/Week – 5**	
FIRST ALLIED COURSE-III		**Credits – 3**	
Course Code – 19UMA2AC2		**Internal 25**	**External 75**

Objectives:

- To enable the students to learn the basic concepts of discrete distribution.
- To make the students analyze the concepts of continuous distribution.
- To ensure the students with the ideas of statistical tools.

Course Outcome:

On the Successful completion of the course the student would be able to

CO Number	**CO Statement**	**Knowledge Level**
CO1	Define the chi square Distribution and discuss the applications of chi square Distribution to conduct tests of goodness of fit and independence of attributes.	**K2**
CO2	Explain Student's t, Fisher's t and F statistics and derive their probability Distribution.	**K2**
CO3	Identify the concepts of a discrete probability Distribution and compute the moments, Cumulants, m.g.f and various constants of a discrete probability Distribution and its applications.	**K3**
CO4	Describe the concepts of a continuous probability Distribution and compute the moments, Cumulants, m.g.f and various constants of a continuous probability Distribution and its applications.	**K3**
CO5	Classify the various properties of the correlation and regression co- efficient and their applications.	**K3**

Mapping with Programme Outcomes:

COs/POs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO2	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	S

S-Strong, M-Medium, L-Low

FIRST ALLIED COURSE – III

MATHEMATICAL STATISTICS – III

SYLLABUS

UNIT I

Introduction – Discrete uniform Distribution – Bernoulli Distribution : Moments of Bernoulli Distribution - Binomial Distribution : Moments of Binomial Distribution – Recurrence Relation for the Moments of Binomial Distribution – Factorial Moments of Binomial Distribution –Mean Deviation about Mean of Binomial Distribution – Mode of Binomial Distribution – Moment Generating Function of Binomial Distribution – Additive Property of Binomial Distribution –Characteristic Function of Binomial Distribution – Cumulants of the Binomial Distribution –Poisson Distribution : The Poisson Process – Moments of the Poisson Distribution – Mode of the Poisson Distribution – Recurrence Relation for Moments of the Poisson Distribution – Moment Generating Function of the Poisson Distribution – Characteristic Function of the Poisson Distribution – Cumulants of the Poisson Distribution – Additive or Reproductive Property of Independent Poisson Variates – Probability Generating Function of Poisson Distribution.

UNIT II

Introduction – Normal Distribution : Normal Distribution as a Limiting Form of Binomial Distribution – Chief Characteristics of the Normal Distribution and Normal Probability curve – Mode of Normal Distribution – Median of Normal Distribution – M.G.F. of Normal Distribution – Cumulant Generating Function (c.g.f.) of Normal Distribution – Moments of Normal Distribution – A Linear Combination of Independent Normal Variates – Points of Inflexion of Normal Curves – Mean Deviation About the Mean for Normal Distribution – Area Property (Normal Probability Integral) – Error Function – Importance of Normal Distribution – Fitting of Normal Distribution – Rectangular (or Uniform) Distribution : Moments ofRectangular Distribution – M.G.F. of Rectangular Distribution – Characteristic Function of Rectangular Distribution – Mean Deviation (about mean) of Rectangular Distribution.

UNIT III

Gamma Distribution : M.G.F. of Gamma Distribution – Cumulants Generating Function of Gamma Distribution – Additive Property of Gamma Distribution – Beta Distributions of first kind : Constants of Beta Distributions of first kind – Beta Distributions of second kind : Constants of Beta Distributions of second kind – Exponential Distribution : Moment Generating Function of Exponential Distribution.

UNIT IV

Correlation : Introduction – Meaning of Correlation – Scatter Diagram – Karl Pearson's Co-efficient of Correlation : Limits for Correlation Co-efficient – Assumptions Underlying Karl Pearson's Correlation Co-efficient – Rank Correlation : Spearman's Rank Correlation Co-efficient – Repeated Ranks – Repeated Ranks (continued) – Linear Regression : Introduction – Linear Regression : Regression Co-efficient - Properties of Regression Co-efficient – Angle between two lines of Regression – Standard Error of Estimate or Residual Variance – Correlation Co-efficient between Observed and Estimated Values.

UNIT V

Chi-Square Distribution : Introduction – Derivation of the Chi-Square Distribution –M.G.F. of Chi-Square Distribution : Cumulant Generating Function of χ^2 Distribution – Limiting Form of χ^2 Distribution for large degree of Freedom –Characteristic Function of χ^2 Distribution – Mode and Skewness of χ^2 Distribution – Additive Property of χ^2 Variates – Chi- Square Probability Curve – Students'' Distribution : Introduction – Derivation of the Students't' Distribution – Fisher's't' – Distribution of Fisher's't' – Constants of t-distribution – Limiting Form of 't' Distribution – Graph of 't' Distribution – Critical Values of t – F-Distribution : Derivation of Snedecor's F- Distribution – Constants of F– Distribution – Mode and Points of Inflexion of F- Distribution – Relation between t and F Distributions – Relation between F and χ^2 Distributions.

TEXT BOOKS:

S.No	Authors Name	Title of the Book	Publishers Name	Year of Publication
1.	S.C.Gupta & V.K.Kapoor	Fundamentals Of Mathematical Statistics	Sultan Chand & Sons.	2015

CHAPTERS AND SECTIONS:

UNIT	CHAPTER	SECTIONS
I	8	8.1 to 8.5.9 (omit 8.4.10 to 8.4.12 and 8.5.10) [1]
II	9	9.1 to 9.3.4 (omit 9.2.15) [1]
III	9	9.5 to 9.8.1 [1]
IV	10 11	10.1 to 10.4.2 & 10.7, 10.7.1 to 10.7.3 [1] 11.1 to 11.2.5 [1]
V	15 16	15.1 to 15.3.6 [1] 16.1 to 16.2.7, 16.5, 16.5.1 to 16.5.3, 16.7, 16.8 [1]

REFERENCE BOOKS:

S.No	Authors Name	Title of the book	Publishers Name	Year of Publication
1.	S.C.Gupta & V.K.Kapoor	Elements Of Mathematical Statistics	Sultan Chand & Sons	2004
2.	R.S.N.Pillai & Bhagavathi	Statistics, Theory And Practice	S.Chand & Sons	2008
3.	G.S.S.Bhishma Rao	Probability And Statistics	Scitech Publications (India) Pvt Ltd	2011

Pedagogy:

Power point presentation, Group Discussion, Seminar, Quiz, Assignment.