DEPARTMENT OF MATHEMATICS AND STATISTICS

BINARY ACCREDITATION
Input–Curriculum Design
Metric Title – Outcome Based Curriculum
Four Year Undergraduate Program (FYUGP)

Program: Bachelor of Commerce (B.COM)

SEMESTER	PAPER	PROGRAM OUTCOMES (POs)	PROGRAM SPECIFIC OUTCOMES (PSOs)	COURSE OUTCOMES (COs)
First Semester	Business Mathematics (Multidisciplinary)	Equip the students with necessary skills and knowledge to handle complex business situations using mathematical concepts.	Students will learn the application of mathematical models, skills on financial analysis, business forecasting, financial planning and budgeting, quantitative decision making.	This will help the students to enhance Quantitative analysis skills, optimization techniques, decision making abilities, problem solving attitude and understanding of business models.

Program: Bachelor of Arts & Bachelor of Science (B.A / B.Sc.)

SEMESTER	PAPER	PROGRAM OUTCOMES (POs)	PROGRAM SPECIFIC OUTCOMES (PSOs)	COURSE OUTCOMES (COs)
First Semester	Classical Algebra	The primary objective of this course is to introduce the basic tools of complex numbers, theory of equations, matrices and matrix method of solutions of homogeneous linear equations up to four variables.	This course will enable the students to employ De Moivre's theorem in a number of applications to solve numerical problems, learn the basic concepts of exponential, logarithmic and hyperbolic functions of complex numbers, learn how to find the nature of the roots of a given polynomial equation by Descartes' rule, also learn about symmetric functions of the roots for cubic and biquadratic equations, learn how to solve cubic and recognize biquadratic equations, consistent and inconsistent systems of linear equations by the row echelon form of the augmented matrix and finding inverse and rank of a matrix.	On completion of this course, the student will have a clear-cut understanding of some important concepts of Classical Algebra, Abstract Algebra and Linear Algebra.

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CLASS	PAPER	PROGRAM OUTCOMES (POs)	PROGRAM SPECIFIC OUTCOMES (PSOs)	COURSE OUTCOMES (COs)
First Semester	Descriptive Statistics and Probability-I	The objective is to give students foundational ideas about the various statistical methods, measures of central tendency and basics of probability. The students are introduced to the methods of collecting data, their representational formats and basic statistical tools.	It will help the students in understanding statistical concepts, data visualization; enhance data analysis skills and statistical software proficiency.	At the end of the course, students will be able to analyse a data set, represent the data in tabular and diagrammatic form, prepare the frequency distribution, find the summary measures viz. the measures of central tendency, of a measure of dispersion, measures of skewness and kurtosis univariate data

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Second Semester	Calculus	Calculus is referred as 'Mathematics of change' and is concerned with describing the precise way in which changes in one variable relate to the changes in another. Through this course, students can understand the quantitative change in the behaviour of the variables and apply them on the problems related to the environment.	Practical implementation in describing the change of one variable relating to other and to apply in various business and real life examples.	The students who take this course will be able to understand continuity and differentiability in terms of limits, describe asymptotic behaviour in terms of limits involving infinity and understand the importance of mean value theorems.

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CLASS	PAPER	PROGRAM OUTCOMES (POs)	PROGRAM SPECIFIC OUTCOMES (PSOs)	COURSE OUTCOMES (COs)
Second Semester	Correlation and Regression, Probability Distributions, Statistical Inference-I and Finite Difference	The course will expose students to the need nuances of correlation and basic probability distributions along with the notions of Uncertainty and Randomness, Probability and Random variables and Basic Data Analysis.	This will help to know how correlation, regression occurs in the daily life and to study them using statistical expressions. Further study can be done using various distributions and inference can be made on the observations.	At the end of the course, students will be able to apply the tools of correlation and model building in data analysis along with learning the use of basic probability distributions.

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Third Semester	Ordinary Differential Equations	The main objective is to introduce the students to the exciting world of differential equations and their solutions methods.	Understanding ODE concepts will help to do modeling using it.	This course will enable students to learn basics of 1^{st} order ordinary differential equations and learn different techniques for solving the differential equations.

CLASS	PAPER	PROGRAM OUTCOMES (POs)	PROGRAM SPECIFIC OUTCOMES (PSOs)	COURSE OUTCOMES (COs)
Third Semester	Survey Sampling and Design of Experiments-1	This course is designed to provide students with knowledge about the techniques of data collection.	This will help to do data collection by various techniques and to design the sampling frame, analysis of the data in the practical life using various designs.	At the end of the course, students will be able to know the basic design of sampling schemes.

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Fourth Semester	Real Analysis	The course will develop a deep and rigorous understanding of real line R and of defining terms to prove the results about convergence and divergence of sequences and series of real numbers. These concepts have wide range of applications in real life scenario.	This will help to apply the convergence, divergence concepts in a simple way in the daily life problems.	This course will enable the students to understand many properties of the real line R, including completeness and Archimedean properties. Learn to define sequences in terms of functions from N to a subset of R. Recognize bounded, convergent, divergent, Cauchy and monotonic sequences and to calculate their limit superior, limit inferior, and the limit of a bounded sequence. Apply limit comparison tests for convergence, the ratio, root, Raabe's, integral tests for convergence of an infinite series of real numbers. Alternating series and absolute convergence of an infinite series of real numbers.

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Fourth Semester	Applied Statistics	This course has the objective of exposing students the different domains of applied statistics.	This will lead to solve problems in industrial sectors, time series predictions, constructing index numbers, study the populations.	At the end of the course, students shall be able to understand how statistics is directly applied in economic analysis, govt. and society.

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Fifth Semester	Discrete Mathematics	The course aims at introducing the concepts of ordered sets, lattices, sub-lattices and homomorphisms between lattices. It also includes introduction to modular and distributive lattices along with complemented lattices and Boolean algebra. Then some important applications of Boolean algebra are discussed in switching circuits.	This will enable students' algorithmic thinking capacity, logical reasoning, modeling and abstraction, combinatorial analysis, discrete structures, problem solving with formal methods and to know its application in computer science.	After the course, the student will be able to: i) Understand the notion of ordered sets and maps between ordered sets. ii) Learn about lattices, modular and distributive lattices, sub-lattices and homomorphisms between lattices. iii) Become familiar with Boolean algebra, Boolean homomorphism, Karnaugh diagrams, switching circuits and their applications

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Fifth Semester	Operations Research	This course has the objective of inculcating the skills of Operations Research.	This will enhance student's ability to optimize problems, making strategies in games, minimizing the costs.	At the end of the course, students shall be able to use techniques of operations research to obtain optimization in field level problems.

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Sixth Semester	Numerical Analysis	To comprehend various computational techniques to find approximate value for possible root(s) of non-algebraic equations, to find the approximate solutions of system of linear equations and Quadratic equations.	It will enhance student's ability to solve complex mathematical functions by finding an approximate solution.	The course will enable the students to learn some numerical methods to find the zeroes of nonlinear functions of a single variable and solution of a system of linear equations, up to a certain given level of precision, know about iterative and non-iterative methods to solve system of linear equations know interpolation techniques to compute the values for a tabulated function at points not in the table. Integrate a definite integral that cannot be done analytically Find numerical differentiation of functional values. Solve differential equations that cannot be solved by analytical methods

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Sixth Semester	Demography and Vital Statistics	This course has the objective of exposing students the different domains of population and its characteristics.	This can help to conduct surveys for censuses and to study various rates and ratios concentrating to the society or region or in the country.	At the end of the course, students shall be able to understand how statistics is directly related in conducting censuses, studying population.

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Third Semester	Business Statistics (Multidisciplinary)	The objective of this course is to familiarize students with the basic statistical tools used for managerial decision-making.	Students will have proficiency in data analysis, statistical modeling, market research skills, quality control and process improvement, financial analysis, risk management.	This will help the students to know the basics of statistics like descriptive statistics, probability theory, inference, correlation, regression, applied statistics and to apply in the real world.

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SEMESTER	PAPER	PROGRAM OUTCOMES (POs)	PROGRAM SPECIFIC OUTCOMES (PSOs)	COURSE OUTCOMES (COs)
Sixth Semester	Business Research Methods and Project Work (BRMPW)	The course aims at providing the general understanding of business research and its methods.	Students will be assigned to do project work which will be done using the concepts learned in this course.	The course will impart learning about how to collect, analyze, present and interpret data.

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