

Session 2020-21

Programme and Course Outcome

B. Sc (CSM)



***Multani Mal Modi College,
Patiala***

Program Outcomes (POs)

- PO1: Ability to communicate various concepts of mathematics, statistics and computer effectively using examples and their geometrical visualizations.
- PO2: Good overall knowledge of Statistics covering various aspects. As a result, they will not only be able to understand the important statistical techniques but also able to apply some commonly used statistical techniques to other fields.
- PO3: Ability to employ critical thinking in understanding the concepts in every area of mathematics and statistics.
- PO4: Ability to examine basic statistical issues in a more logical and methodical manner.
- PO5: Capability to identify logical flaws and loopholes in the arguments of practicing Statisticians, analyze and synthesize data from a variety of sources and accordingly draw conclusions.
- PO6: Capability for inquiring about appropriate questions relating to the concepts in various fields.
- PO7: Ability to think, acquire knowledge and skills through logical reasoning and to inculcate the habit of self-learning.

Course Outcomes (COs)

B. Sc. (CSM) - I

Semester-1st

Code	Course
CSM 111	Algebra
CSM 112	Trigonometry and Differential Calculus
CSM 113	Computer Oriented Statistical Methods I
CSM 114	Probability Theory I
CSM 116	Introduction to Information Technology
CSM 117	Computer Programing using C
	Qualifying Compulsory / Elementry Punjabi

Semester-2nd

Code	Course
CSM-121	Integral Calculus & differtial equations
CSM-122	Geometry
CSM-123	Computer oriented statistical method-II
CSM-124	Probability Theory -II
CSM-126	Object Oriented Programming using C++
CSM-127	Management Information System
	Punjabi Compulsory

CSM-111 ALGEBRA

- C01: Understand Relations between the roots and coefficients of general polynomial equation
C02: Understand Matrix Algebra in context of Vectors.
C03: Apply computational techniques and algebraic skills essential for the study of Matrix Algebra.
C04: Apply the knowledge of Matrix algebra in scientific fields.
C05: Use the techniques of algebra in Statistics

CSM-112 : TRIGONOMETRY AND DIFFERENTIAL CALCULUS

- CO 1: Understand Trigonometry including DeMoivre's theorem and its applications, Gregory's series and Summation of series.
CO 2: Understand the concept of limit, continuity of a function at a point, Differentiability, Concavity and convexity, Asymptotes, Curvature and Tracing of curves
CO3: Solve higher order algebraic equations

Programme & Course Outcomes of B. Sc. (CSM) (Session 2020-21)

CO4: Investigate and formulate various test and parameters used for analysis of current flow and sound waves in physics, computer science.

CO 5: Apply the concepts of trigonometry in complex analysis

CSM-113 : COMPUTER ORIENTED STATISTICAL METHODS-I

CO1: Study data and its representation

CO2: understand Measures of central tendency, Dispersion, Skewness and Kurtosis

CO3: interpret important theorems on probability and their use in solving real life problems

CO4: Know correlation, correlation coefficients and its applications.

CSM-114 : PROBABILITY THEORY-I

CO1: Distinguish between random and non-random experiments.

CO2: Conceptualise the probabilities of events including frequentist and axiomatic approach.

CO3: Learn the notion of conditional probability including the concept of Bayes' Theorem.

CO4: Related the concept of discrete and continuous random variables and their probability distributions including expectation and moments of one as well as two variables.

CSM-116 INTRODUCTION TO INFORMATION TECHNOLOGY

Upon the completion of the course the learner will be able to

PO-1: Familiarization with the types of computer, peripheral devices, memory management, multimedia and number system.

PO-2: Learn about working of various input and output devices.

PO-3: Learnt about binary number representation along with its operations.

PO-4: Understand theoretical framework of internet and associated application of the internet.

PO-5: Acquire the knowledge about the binary number representation along with its operations.

PO-6: Understand of the role of computers in business, education and society.

CSM-117 COMPUTER PROGRAMING USING C

After completion of this course, students will be able to:

CO-1: Understand of various concepts of programming language.

CO-2: Develop logics and analytical ability solve problem.

CO-3: Learn about procedural programming using functions.

CO-4: Acquired various flow control statements.

CO-5: Learn about various storage classes along with user defined data types.

CO-6: Acquire knowledge of file handling

CO-7: Work with arrays of complex structure data types.

CO-8: Understanding a concept of functional hierarchical code organization

PUNJABI

ਪੜ੍ਹਾਈ ਉਪਰੰਤ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਯੋਗਤਾ ਅਤੇ ਸਮਰਥਾ ਵਿਚ ਸਾਰਥਕ ਵਾਧਾ ਹੋਵੇਗਾ

1. ਸਾਹਿਤਕ ਰਚਨਾਵਾਂ ਦੇ ਮਾਧਿਅਮ ਨਾਲ ਵਿਦਿਆਰਥੀਆਂ ਅੰਦਰ ਸਾਹਿਤਕ ਰੁਚੀਆਂ ਦਾ ਵਿਕਾਸ ਹੁੰਦਾ ਹੈ।
2. ਭਾਸ਼ਾ ਦੀ ਸਿਧਾਂਤਕ ਜਾਣਕਾਰੀ ਨਾਲ ਵਿਦਿਆਰਥੀ ਦੀ ਭਾਸ਼ਾਈ ਸਮਰੱਥਾ ਵਿਚ ਵਾਧਾ ਹੁੰਦਾ ਹੈ
3. ਸਮਾਜਕ ਵਾਤਾਵਰਣ ਤੇ ਸਭਿਆਚਾਰਕ ਵਿਸ਼ਿਆਂ ਸਬੰਧੀ ਗਿਆਨ ਦੀ ਪ੍ਰਾਪਤੀ ਹੋਵੇਗੀ।
4. ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਆਲੋਚਨਾਤਮਕ ਤੇ ਸਿਰਜਣਾਤਮਕ ਸੋਚ/ਪਹੁੰਚ ਦਾ ਵਿਕਾਸ ਹੋਵੇਗਾ ਜਿਸ ਨਾਲ ਉਹ ਸਮਾਜ ਪ੍ਰਤੀ ਜ਼ਿੰਮੇਵਾਰ ਹੁੰਦੇ ਹਨ।
5. ਮਨੁੱਖੀ ਹੋਂਦ ਦੇ ਸੰਕਟਾਂ ਦੀ ਨਿਸ਼ਾਨਦੇਹੀ ਅਤੇ ਉਹਨਾਂ ਦਾ ਯੋਗ ਹੱਲ ਲੱਭਣ ਦੇ ਸਮਰੱਥ ਹੋਣਗੇ।
6. ਵਿਦਿਆਰਥੀ ਆਪਣੇ ਵਿਚਾਰਾਂ ਨੂੰ ਲਿਖਿਤ ਅਤੇ ਮੌਖਿਕ ਰੂਪ ਵਿਚ ਵਿਅਕਤ ਕਰਨ ਦਾ ਹੁਨਰ ਹਾਸਲ ਕਰਨਗੇ।
7. ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੀ ਵਿਆਕਰਨਕ ਮੁਹਾਰਤ ਨਾਲ ਕਿਸੇ ਵੀ ਹੋਰ ਭਾਸ਼ਾ ਨੂੰ ਆਸਾਨੀ ਨਾਲ ਗ੍ਰਹਿਣ/ਸਮਝਣ ਦੀ ਯੋਗਤਾ ਦਾ ਵਿਕਾਸ ਹੋ ਜਾਂਦਾ ਹੈ।

CSM 121: INTEGRAL CALCULUS AND DIFFERENTIAL EQUATIONS

CO 1: Understand definite integrals ,Quadrature and rectification ,Volumes and surfaces of solids of revolution

CO 2: Apply and deduce Area and volume of two dimensional surfaces using analytical methods.

CO3: Solve Equations of first order and first degree, Equations of First order higher degree, Linear differential equations of second order

CO 4: Understand Geometrical meaning of a differential equation and Orthogonal trajectories

CO 5: Apply fundamental principles of Ordinary and Partial Differential Equations for solving parabolic, hyperbolic and elliptic equations.

CO 6: Develop the ability to apply differential equations to significant applied and theoretical problems.

CSM 122- GEOMETRY

CO 1: Understand and identify general equation of conics, Sphere, Cone and cylinder.

CO 2: Understand and identify Pole and polar forms of conic ,Special properties of parabola, ellipse and hyperbola

CO 3: Identify and Investigate curves represented by second degree equation in two variables.

CO 4 : Solve and reduce second degree equation to standard forms.

CO 5: Apply and judge shape of curves correlate their physical properties.

CO 6: Formulate his knowledge in animation, aviation, computer graphics, construction, engineering and many more real world domains

CSM 123 (Computer Oriented Statistical Methods-II)

CO 1: Understand Bivariate Data: Scatter Diagram, Product Moment Correlation Coefficient and Its Properties.

CO 2: Find Coefficient of Determination. Spearman's Rank Correlation Coefficient.

Programme & Course Outcomes of B. Sc. (CSM) (Session 2020-21)

CO 3: Understand Concept of Errors in Regression, Principle of Least Square, Fitting of Linear Regression and Related Results.

CO 4: Apply Concepts of Multiple Regression, Correlation to real life problems.

CO 5: Analyze the data using various measures of Association for Two Way Classified Data.

CSM-124 (PROBABILITY THEORY– II)

CO 1: Understand Standard univariate discrete and continuous distributions.

CO 2: Apply Chebyshev's inequality and weak law of large Numbers in daily life..

CO 3: Understand central limit theorem, which establish the remarkable fact that the empirical frequencies of so many natural populations, exhibit a bell shaped curve.

CSM-126 OBJECT ORIENTED PROGRAMING USING C++

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

CO-1: Understand the benefits of Object-Oriented Programming (OOP) as compare to Traditional Programming approach and resolve problem in domain of object-oriented programming.

CO-2: Familiarization with a widely range of features of object-oriented programming using C++

CO-3: Understand Object oriented approach for finding solutions to various problems with the help of C++ language.

CO-4: Understand the concept of polymorphism with the help function overloading and virtual functions.

CO-5: Acquire various types of various types and forms of inheritance.

CO-6: Understand basic of generic functions and classes.

CSM-127 MANAGEMENT INFORMATION SYSTEM

After completion of this course, students will be able to:

CO-1: Understand the concept of information, system, value of information, elements of a system and role of information system.

CO-2: Understand the classification of MIS.

CO-3: Experience various stages in the development of MIS and applications of Information Systems in functional areas of MIS.

CO-4: Have a clear idea about DSS and its difference from MIS.

PUNJABI

ਉਪਰੰਤ ਵਿਦਿਆਰਥੀਆਂ ਦੀ ਯੋਗਤਾ ਅਤੇ ਸਮਰਥਾ ਵਿਚ ਸਾਰਥਕ ਵਾਧਾ ਹੋਵੇਗਾ

1. ਵਿਆਕਰਨਕ ਪੱਧਰ ਉੱਤੇ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਨੂੰ ਸ਼ੁੱਧ ਰੂਪ ਵਿਚ ਉਚਾਰਨ, ਲਿਖਣ ਅਤੇ ਪੜ੍ਹਨ ਦਾ ਹੁਨਰ ਪੈਦਾ ਹੁੰਦਾ ਹੈ।
2. ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਦੇ ਸ਼ਬਦ ਨਿਰਮਾਣ ਪ੍ਰਬੰਧ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
3. ਵਾਰਤਕ ਨਾਲ ਸਬੰਧਿਤ ਵਿਸ਼ੇ ਪੜ੍ਹਨ ਕਰਕੇ ਵਿਦਿਆਰਥੀਆਂ ਵਿਚ ਨਵੇਂ ਵਿਚਾਰ ਪੈਦਾ ਹੁੰਦੇ ਹਨ।
4. ਵੱਖ ਵੱਖ ਉਪਭਾਸ਼ਾਵਾਂ ਦੀ ਵੱਖਰਤਾ ਰਾਹੀਂ ਪੰਜਾਬ ਦੀ ਭਾਸ਼ਾਈ ਭਿੰਨਤਾ ਤੇ ਵਿਸ਼ਾਲਤਾ ਦਾ ਗਿਆਨ ਹੁੰਦਾ ਹੈ।
5. ਨਿਜੀ ਅਤੇ ਵਪਾਰਕ ਚਿੱਠੀ-ਪੱਤਰ ਰਾਹੀਂ ਸਰਲ ਪੇਸ਼ਕਾਰੀ ਅਤੇ ਸੰਚਾਰ ਯੋਗਤਾ ਦਾ ਵਿਕਾਸ ਹੁੰਦਾ ਹੈ।

Course Outcomes (COs)

B. Sc (CSM) - II Semester-3rd

Code	Course
CSM 231	Advance Calculus
CSM 232	Differential Equation
CSM 233	Applied Statistics
CSM 234	Statistical Inference-I
CSM 236	Data Structure
CSM 237	DBMS

Semester-4th

CODE	COURSES
CSM 241	Real analysis
CSM 242	Topics in analysis
CSM 243	Industrial Statistics
CSM 244	Statistical Inference-II
CSM 246	Operating System
CSM 247	A.S.P.NET

CSM 231: ADVANCED CALCULUS

- CO 1: Analyze and relate sequences and series of real values functions in terms of convergence in and divergence in R^2 .
- CO 2: Understand the Concept of Point-wise and Uniform convergence of sequence and series of functions with special reference to power Series.
- CO 3: Identify and discuss the convergence of sequence and series of functions.
- CO 4: Understand the use of derivatives in Taylor's theorem, error estimation, and to Find Maximum and Minimum values of real-life situations.

CSM 232: DIFFERENTIAL EQUATIONS

- CO-1: Obtain series solutions of several important classes of ordinary differential equations including Bessel's, Legendre differential equations. Also able to derive the generating functions and recurrence relations, orthogonality properties and interpret their qualitative behaviour.
- CO-2: Discover the use of Bessel, Legendre's, Hermite's equations in real-life problems.
- CO 3: Solve the first-order linear PDE's with the aid of Lagrange's method and non-linear PDEs of first order with Charpits' method.
- CO 4: Derive solutions of linear PDEs of second and higher order with constant coefficients.

Programme & Course Outcomes of B. Sc. (CSM) (Session 2020-21)

CO 5: Apply and formulate integral transform techniques applied to various situations in physics, engineering, and other mathematical contexts.

CSM 233: APPLIED STATISTICS

CO 1: Learn the Definition of Time Series, components of a time series and methods of fitting mathematical curves..

CO 2: Interpret and visualize problems involved in the construction of index numbers, criterion of good index numbers, errors in index numbers.

CO3: Use some useful concepts to get an important background material for taking up an advanced course in financial econometrics and data analysis.

CSM 234 : STATISTICAL INFERENCE – I

CO1: Understand the notion of a parametric models, point and interval estimation of the parameters of those models.

CO2: Obtain the sufficient statistic, minimal sufficient statistic, m.l.e., moment estimator of the parameter.

CO3: Understand the concept of MVUE, UMP , UMPU test with there applications.

CO4: Compute probabilities of types of error, asymptotic confidence interval of a parameter and its relation with testing of hypothesis problem.

CO5: Formulate null and alternative hypotheses and apply small, large sample and non-parametric tests in real life problems.

CSM-236 :DATA STRUCTURE COURSE OUTCOMES

After completion of this course, students will be able to:

CO-1: Be familiar with basic data structure and algorithms.

CO-2: Design and analyze programming problem statements

CO-3: Choose appropriate data structures and algorithms and use it to design algorithms for a specific problem.

CO-4: Handle operations like searching, insertion, deletion and traversing mechanism

CO-5: Come up with analysis of efficiency and proofs of correctness

CSM-237 DATA BASE MANAGEMENT SYSTEM

Upon the completion of the course the learner will be able to

CO-1: Familiarization with various features and applications of Database Management system.

CO-2: Acquire knowledge about database languages (DDL, DML, DCL)

CO-3: Learn how to design a database by using different data models.

CO-4: Understand the database handling during execution of the transactions along with concurrent access.

CO-5: Ability to perform various types of SQL queries.

CO-6: Able to design a good database using normalization, decomposition and functional dependency

CSM 241: REAL ANALYSIS

- CO 1: Understand the concept of Riemann Integration.
- CO 2: Implement logical thinking to prove the basic results of real analysis.
- CO 3: Relate the concept of infinite series and Improper Integrals.
- CO 4: Understand the concept of Limit, Continuity of Functions of several variables, differentiability of real-valued functions of two variables.
- CO 5: Understand the use of partial derivatives in Taylor's theorem, error estimation, and to find Maximum and Minimum values of real-life situations.

CSM 242: TOPICS IN ANALYSIS

- CO1: Understand the concept of Beta and Gamma functions, double and triple Integrals.
- CO2: Evaluate Line, surface and volume integrals.
- CO 3: Identify and apply Greens Theorem, Stokes Theorem, and the Divergence Theorem.
- CO 4: Investigate the Theory of Vector Calculus with relevant examples.
- CO 5: Understand the Concept of Point-wise and Uniform convergence of sequence and series of functions with special reference to power Series.

CSM 243: INDUSTRIAL STATISTICS

- CO 1: Understand the technique of control charts for process control, three sigma control limits and specification limits.
- CO 2: Understand basic of production process monitoring and apply concept of control charts on it.
- CO3: Apply the acceptance and continuous sampling plans in production process.
- CO 4: Know and apply the concept of weighted control charts, six sigma.
- CO5: Apply inventory models to analyze real world systems.

CSM 244: STATISTICAL INFERENCE – II

- CO 1: Learn and get acquainted with various Sampling distributions
- CO 2: Calculate the mean and variance of a univariate normal distribution.
- CO3: Analyze and compare two univariate normal distributions through their means and variances.
- CO 4: Know about exact tests and confidence intervals, Large sample tests, homogeneity of populations and goodness of fit.
- CO 5: Draw conclusions about the whole population on the basis of a sample.

CSM-246: OPERATING SYSTEM

After completion of this course, students will be able to:

- CO-1:** Learn the mechanisms of OS to handle processes and threads and their communication.

Programme & Course Outcomes of B. Sc. (CSM) (Session 2020-21)

CO-2: Use different data types, operators and console I/O function in a computer program.

CO-3: Learn the mechanisms involved in memory management in contemporary OS.

CO-4: Gain knowledge on distributed operating system concepts that includes architecture, deadlock detection algorithms and agreement protocols.

CO-5: Understand different approaches to memory management.

CO-6: Understand the structure and organization of the file system

CSM-247: ASP.NET

CO-1: Write, compile and debug programs using ASP.NET language.

CO-2: Knowledge and Use of different data types, operators, loops and other control structures in web programming.

CO-3: Design programs accepting user inputs and various other standard controls.

CO-4: Understand the implementation of arrays, and events.

CO-5: Comprehend the concepts of classes and objects: declaration, initialization and implementation.

CO-6: Apply the various rich web features like file uploads, debugging, caching and deploying ASP.NET pages et cetera.

CO-7: Understand and learn the concepts related with ASP.NET security, localizing ASP.NET applications.

CO-8: Ability to develop programs to implement and use all the above specified concepts and features in programming.

Course Outcomes (COs)

B. Sc (CSM) - III

Semester- 5th

Code	Course
CSM-351	Communication Skills
CSM-352	Abstract Algebra
CSM-353	Discrete Mathematics
CSM-354	Comp. Ori. Numerical Methods
CSM-355	Sample Surveys
CSM-357	CNDC
CSM-358	Visual Programming

Semester- 6th

CODE	COURSE
CSM 361	Communication Skills
CSM 362	Mechanics
CSM 363	Linear Algebra
CSM 364	Linear Programming
CSM 365	Design and Analysis Of Experiments
CSM 367	Oracle
CSM 368	Software Engineering

CSM 351: COMMUNICATION SKILLS

CO-1: Learn the skills of effective communication and all the methods of communication.

CO-2: Improve reading skills with proper accent and flow.

CO-3: Improve writing skills with all the rules and effective word usage.

CO-4: Learn the all the elements of language reading writing and listening.

CO-5: Learn the use of business elements and business filed documentations as letter writing, purchases etc.

CO-6: Use the abbreviations of words, and make proper sentence making with abbreviation.

CSM 352 : ABSTRAT ALGEBRA

CO 1: Define and construct algebraic structures like Groups, Rings, Unique Factorization Domains, Principal Ideal Domains, Euclidean Domains, Polynomial rings over UFD.

CO 2: Develop new structures based on a given structure and compare them.

Programme & Course Outcomes of B. Sc. (CSM) (Session 2020-21)

CO-3: Analyse algebraic structures in details.

CO 4: Use and prove the definitions and theorems of Abstract Algebra.

CO 5: Use and apply the concepts of Group and Ring Theory in Galois theory, Algebraic geometry, Combinatorics.

CSM 353: DISCRETE MATHEMATICS

CO-1: Understand and Define basic notations in graph theory & trees.

CO-2: Generate the Passwords by using the techniques of counting principles

CO-3: Demonstrate different traversal methods for trees and graphs.

CO-4: Understand set theory, inductive way of thinking, complex counting techniques, Binary relations and recurrence relations.

CO-5: Apply shortest path algorithm to determine fastest driving routes.

CO-6: Construct Model problems in Computer Science using graphs and trees

CO 7: Interpret and investigate applications of Boolean algebra and Boolean functions, logic gates, switching circuits in electronics.

CSM –354: COMPUTER ORIENTED NUMERICAL METHODS.

CO1: Understand the errors, source of error and its effect on any computation.

CO2: Compare the viability of different approaches to numerical solutions of problems arising in roots of solution of non linear equations, ,solution of linear system.

CO3: Tabulate the functions and data set using interpolation and least square curves.

CO4: Solve initial and boundary value problems in differential equation using different numerical methods.

CO5: Apply various numerical methods in real life problems.

CSM –355: SAMPLE SURVEYS

CO1: To learn scientific view to conduct the survey in proper way to collect the data about specific perspective

CO2: Understand the basic principles underlying survey design and estimation.

CO3: Apply the different sampling methods for designing and selecting a sample from a population.

CO4: Implement Cluster sampling, Ratio and Regression estimation in real life problems.

CO5: Analysis the Variance of estimators of population mean, population proportion and their estimators.

CSM –357: COMPUTER NETWORK AND DATA COMMUNICATION

On completion of this course, the students will be able to:

CO-1: On completion of this course, the students will be able to:

CO-2: Understand the basic concepts, types of networks, OSI, ans TCP/IP models

with working of all the layers in detail

CO-3: Learn and understand the working of different hardware components used in networking and various communication protocols

CO-4: Learn and understand various issues involved in network security, and methods used to implement network security.

CSM –358: VISUAL PROGRAMING

On completion of this course, the students will be able to:

CO-1: Design, create, build, and debug Visual Basic applications.

CO-2: Explore Visual Basic's Integrated Development Environment (IDE).

CO-3: Write and apply decision structures for determining different operations.

CO-4: Understand and identify the fundamental concepts of object-oriented programming.

CO-5: Perform tests, resolve defects and revise existing code.

CSM 361: COMMUNICATION SKILLS

CO-1: Learn the skills of effective communication and all the methods of communication.

CO-2: improve reading skills with proper accent and flow.

CO-3: improve writing skills with all the rules and effective word usage.

CO-4: learn the all the elements of language reading writing and listening.

CO-5: learn the use of business elements and business filed documentations as letter writing, purchases etc.

CO-6: use the abbreviations of words, and make proper sentence making with abbreviation.

CSM 362 MECHANICS

CO-1: Understand the necessary conditions for equilibrium of particles acted upon by number of forces.

CO-2: Resolve system of forces to a resultant force and a resultant couple.

CO 3: Learn about the concepts of Null Point, Null Line and Null Plane with respect to a system of forcing on a rigid body.

CO 4: Explain the Kinematics and Kinetics of rectilinear and planar motion of a particle including constrained oscillatory motion .

CO 5: Formulate the knowledge of Mechanics to higher courses like the theory of elasticity, fluid mechanics etc.

CSM 363 LINEAR ALGEBRA

CO-1: Understand real vector spaces, subspaces, basis, dimension, and their properties

CO-2: Use the definition and properties of linear transformations and matrices of linear transformations.

CO 3: Obtain various variants of diagonalization of linear transformations.

Programme & Course Outcomes of B. Sc. (CSM) (Session 2020-21)

CO-4: Apply the knowledge of linear algebra to solve the system of differential equations.

CO-5: Explain the use of linear algebra in coding theory, linear programming, and cryptography.

CSM 364: LINEAR PROGRAMING

CO-1: Provide graphical solutions of linear programming problems with two variables, and

illustrate the concept of convex, extreme points and the simplex method

CO-2: Know about relationships between the primal and dual problems and to understand sensitivity analysis.

CO-3: Learn about the real world applications to transportation and assignment problems

CO-4: Attribute the use of optimization techniques in designing and mathematical modeling.

CO-5: Discover use of sensitivity techniques for predicting the outcome of a decision if a situation turns out to be different compared to the key predictions.

CSM 365: DESIGN AND ANALYSIS OF EXPERIMENTS

CO 1: Understand Linear models, the fixed effect models, the distribution of minimum error sum of squares, and the conditional error sum of squares.

CO 2: Interpret Completely randomized design, randomized block design and Latin square design and their advantages and disadvantages.

CO 3: Construct an idea of conducting the sample surveys and selecting appropriate sampling techniques.

CO 4: Carry out one way and two way Analysis of Variance,

CO 5: Use appropriate experimental designs to analyze the experimental data.

CSM-367: ORACLE

On completion of this course, the students will be able to:

CO-1: Gain the knowledge and understanding of Database analysis and design.

CO-2: Understand the use of Structured Query Language(SQL) and learn SQL syntax.

CO-3: Gain the knowledge of the processes of Database Development and Administration using SQL and PL/SQL.

CO-4: Understand and apply the concept of functional dependencies to design the database

CO-5: Understand and apply the concept of Transaction and Query processing

CSM - 368: SOFTWARE ENGINEERING

On completion of this course, the students will be able to:

CO-1: Understand the basic concepts, models, life cycle of software development.

Programme & Course Outcomes of B. Sc. (CSM) (Session 2020-21)

CO-2: Learn higher level concepts like Re-engineering, Reverse Engineering, Forward Engineering, and CASE tools.

CO-3: Knowledge of all the steps of software engineering and their use and implementation in real problems

CO-4: Understanding of programming language and using it to develop software using all stages of software development.

M. M. Modi College