Session 2019-20

Programme and Course Outcome

B.Sc Math Hons

Multani Mal Modi College, Patiala

Program Outcomes (POs)

The students has

PO1: Ability to communicate various concepts of mathematics, and computer effectively using examples and their geometrical visualizations.

PO2: Capability of demonstrating comprehensive knowledge of mathematics.

PO3: Ability to employ critical thinking in understanding the concepts in every area of mathematics.

PO4: Ability to analyze the results and apply them in various problems appearing in different branches of mathematics.

PO5: Ability to provide new solutions using the domain knowledge of mathematics

PO6: Capability for inquiring about appropriate questions relating to the concepts in various fields of mathematics.

PO7: Ability to think, acquire knowledge and skills through logical reasoning and to inculcate the habit of self-learning.

PO8: Enough knowledge for pursuing higher studies and research in pure and applied mathematics.

PO9: Ability to qualify various national and international competitive examinations.

Course Outcomes (COs)

B.Sc Math Hons – I
Semester – 1

Code	Title of Course
BMH 101	Calculus- I
BMH102	Coordinate Geometry
CS 103	Introduction to Information Technology
CS 104 A	Computer Programming using C
CS 104 B	Software Lab I (C- Programming)
SC 105	Mathematical Foundations of Statistics
PBI 106	Punjabi I/ Mudhla Gyan

Semester-2nd

Code	Title of Course
BMH 201	Calculus- II
BMH 202	Ordinary Differential Equations
CS 203	Computer System Architecture
CS 204 A	Object Oriented Programming using C++
CS 204 B	Software Lab II (C++)
SC 205	Linear Programming
PBI 206	Punjabi II/ Mudhla Gyan

After Completion of the course the student will be able to:

BMH 101: Calculus-I

CO 1: Understand the concept of limit, continuity of a function at a point, Concavity and convexity, Asymptotes, definite integrals and mean value theorems

CO 2: Exhibit and recall previous learning in integrals and infinite series.

CO 3: Apply and deduce Area and volume of two dimensional surfaces using analytical methods.

CO 4: Evaluate convergence and divergence of sequence and series.

CO 5: Apply derivative tests in optimization problems appearing in social sciences, physical sciences, life sciences and other disciplines.

BHM 102: Coordinate Geometry

Co 1: Find joint equation of straight line, angle bisectors, general equation of conics, Sphere, Cone and cylinder.

CO2: Develop knowledge about Tangent Plane , reciprocal cones , conicoids.

CO3: Identify and Investigate second degree equation in two variables.

CO4: Apply and judge shape of curves correlate their physical properties.

CO5: Relate and integrate geometry into real life contexts as well as into other disciplines.

CS- 103: 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 theinternet.

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.

CS-104 A: Computer Programming 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.

CS-104 B: Software Lab-I (C- Programming)
After completion of this course, students will be able to:

CO-1: Design algorithms and flowchart to solve programming problems.

CO-2: Write, compile and debug programs in C language. Use different data types, operators and console I/O function in a computer program.

CO-3: Design programs involving decision control statements, loop control statements and case control structures.

CO-4: Understand the implementation of arrays, pointers and functions and apply the dynamics of memory by the use of pointers.

CO-5: Comprehend the concepts of structures and union: declaration, initialization and implementation.

CO-6: Use the file operations, character I/O, string I/O, file pointers, and create/update basic data files.

SC 105: Mathematical Foundation of Statistics
CO1: Discuss and define discrete and continuous random Variables, cumulative distributive function, expectations, variance, moment etc.
CO2: Understand and study various Discrete and continuous probability distributions, Bayes theorem and Paly's urn model.
CO3: Execute the concept central limit theorem and weak law of large numbers in approximation theory.
CO4: Design solution of certain logical problems using Uncertainity, information and entropy.
CO5: Formulate his learning in statistical quality control.

PBI 106:- PUNJABI-I/ Mudhla Gyan

1. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਕਹਾਣੀ ਅਤੇ ਪੰਜਾਬੀ ਕਵਿਤਾ ਬਾਰੇ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਨਗੇ। ਉਹ ਲੇਖ ਰਚਨਾ ਦੇ ਮੁੱਢਲੇ ਨਿਯਮਾਂ ਅਤੇ ਪੰਜਾਬੀ ਦੀ ਧੁਨੀ ਵਿਉਂਤ ਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਨਗੇ।

2. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਵਿਚਲੇ ਸਮਾਜ-ਸਭਿਆਚਾਰਕ ਸਰੋਕਾਰਾਂ ਅਤੇ ਮਨੁੱਖੀ ਜੀਵਨ ਨਾਲ ਸਬੰਧਤ ਸਰੋਕਾਰਾਂ ਬਾਰੇ ਜਾਣਨਗੇ। ਇਸ ਦੇ ਨਾਲ ਹੀ ਭਾਸ਼ਾ ਦੇ ਸਿਧਾਂਤਕ ਪੱਖ ਅਤੇ ਵਿਹਾਰਕ ਪੱਖ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਕਰਨਗੇ।

3. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੀ ਗਹਿਨ ਪੜ੍ਹਤ ਵਿਚੋਂ ਮਨੁੱਖ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਆਲੋਚਨਾਤਮਕ ਅਤੇ ਵਿਸਲੇਸ਼ਣੀ ਸੂਝ ਪ੍ਰਾਪਤ ਕਰ ਸਕਣਗੇ ਜਿਸ ਦੇ ਆਧਾਰ 'ਤੇ ਉਹ ਇਕ ਆਦਰਸ਼ ਮਨੁੱਖ ਵਾਲਾ ਜੀਵਨ ਬਤੀਤ ਕਰਨ ਦੇ ਕਾਬਿਲ ਹੋ ਜਾਣਗੇ।

4. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਕਹਾਣੀ ਅਤੇ ਕਵਿਤਾ ਵਿਚੋਂ ਮਨੁੱਖ ਦੇ ਇਕ ਆਦਰਸ਼ ਮਾਡਲ ਨੂੰ ਗ੍ਰਹਿਣ ਕਰਨਗੇ ਅਤੇ ਇਸ ਦੇ ਆਧਾਰ 'ਤੇ ਇਕ ਨਰੋਏ ਸਮਾਜ ਦੀ ਉਸਾਰੀ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

5. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਆਪਣੀ ਪਕੜ ਮਜ਼ਬੂਤ ਕਰਨਗੇ ਅਤੇ ਇਸ ਦੀ ਕਲਾਤਮਕ ਅਤੇ ਆਦਰਸ਼ਕ ਵਰਤੋਂ ਕਰਦੇ ਹੋਏ ਭਾਵਾਂ ਅਤੇ ਵਿਚਾਰਾਂ ਦੀ ਰਚਨਾਕਾਰੀ ਕਰਨ ਵੱਲ ਰੁਚਿਤ ਹੋਣਗੇ।

BMH 201: Calculus- II
After Completion of the course the student will be able to:
CO 1: Understand the concept of vectors in the plane Cartesian Co-ordinates and space curves, line and surface integrals.
CO 2: Interpret in idea of multivariate functions in terms of partial derivatives and multiple integrals.

CO 3: Apply and deduce Area and volume of three dimensional surfaces using analytical methods.

CO 4: Estimate maxima and minima and other mathematical properties of curve and surfaces.

CO 5: Investigate and formulate mathematical modelling in projectile motion using vector analysis.

BMH 202: Ordinary Differential Equations

CO-1: Recognize various definitions of linear and non linear ordinary differential equation and methods to solve them.

CO-2: Understand various methods to solve second order linear differential with constant and variable coefficients.

CO-3: Apply ODE in successive approximation.

CO-4: Discover the use of Bessel, Legendre's, Hermite's equations in real life problems.

CO-5: Evaluate use of differential equations in intergral curves and isocleans.

CS 203: Computer System Architecture
After completion of this course, students will be able to:

CO-1: Understand computer organization and its working, processing of an instruction by the CPU.

CO-2: Understand the various other important component of a computer system like Memory, Registers, Arithmetic Logic unit, Control unit, Peripheral devices.

CO-3 Learn the concepts related with execution of instructions, working of addressing modes, interface and its use in the working of peripheral devices, interrupt signals, direct memory access.

CO-4: Learn the concepts related with digital electronics to understand the working of components like logic gates, flip flops, counters, and multiplexers etc., which are used to build components in a computer.

CS 204 A: Object Oriented Programming 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

CS 204 B: Software Lab II (C++)

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

CO-1: Understand the intricacies of Object Oriented Programming including the features and peculiarities of the C++ programming language.

CO-2: Illustrate the concept of Inheritance, operator overloading, and polymorphism.

CO-3: Implement various objects oriented concepts to solve practical problems.

CO-4: Apply the concepts of OOPs using C++ in programming.

SC 205: Linear Programming

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 modeking.

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.

PBI 206: Punjabi II/ Mudhla Gyan

1. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਕਹਾਣੀ ਅਤੇ ਪੰਜਾਬੀ ਕਵਿਤਾ ਬਾਰੇ ਮੁੱਢਲੀ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਨਗੇ। ਉਹ ਲੇਖ ਰਚਨਾ ਦੇ ਮੁੱਢਲੇ ਨਿਜਮਾਂ ਅਤੇ ਪੰਜਾਬੀ ਦੀ ਧੁਨੀ ਵਿਉਂਤ ਦੇ ਮੁੱਢਲੇ ਸੰਕਲਪਾਂ ਬਾਰੇ ਜਾਣਕਾਰੀ ਹਾਸਲ ਕਰਨਗੇ।

2. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਵਿਚਲੇ ਸਮਾਜ-ਸਭਿਆਚਾਰਕ ਸਰੋਕਾਰਾਂ ਅਤੇ ਮਨੁੱਖੀ ਜੀਵਨ ਨਾਲ ਸਬੰਧਤ ਸਰੋਕਾਰਾਂ ਬਾਰੇ ਜਾਣਗੇ। ਇਸ ਦੇ ਨਾਲ ਹੀ ਭਾਸ਼ਾ ਦੇ ਸਿਧਾਂਤਕ ਪੱਖ ਅਤੇ ਵਿਹਾਰਕ ਪੱਖ ਬਾਰੇ ਜਾਣਕਾਰੀ ਪ੍ਰਾਪਤ ਕਰਨਗੇ।

3. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਸਾਹਿਤ ਦੀ ਗਹਿਨ ਪੜ੍ਹਤ ਵਿਚੋਂ ਮਨੁੱਖ ਅਤੇ ਸਮਾਜ ਪ੍ਰਤੀ ਆਲੋਚਨਾਤਮਕ ਅਤੇ ਵਿਸਲੇਸ਼ਣੀ ਸੂਝ ਪ੍ਰਾਪਤ ਕਰ ਸਕਣਗੇ ਜਿਸ ਦੇ ਆਧਾਰ 'ਤੇ ਉਹ ਇਕ ਆਦਰਸ਼ ਮਨੁੱਖ ਵਾਲਾ ਜੀਵਨ ਬਤੀਤ ਕਰਨ ਦੇ ਕਾਬਿਲ ਹੋ ਜਾਣਗੇ।

4. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਕਹਾਣੀ ਅਤੇ ਕਵਿਤਾ ਵਿਚੋਂ ਮਨੁੱਖ ਦੇ ਇਕ ਆਦਰਸ਼ ਮਾਡਲ ਨੂੰ ਗ੍ਰਹਿਣ ਕਰਨਗੇ ਅਤੇ ਇਸ ਦੇ ਆਧਾਰ 'ਤੇ ਇਕ ਨਰੋਏ ਸਮਾਜ ਦੀ ਉਸਾਰੀ ਵਿਚ ਆਪਣਾ ਯੋਗਦਾਨ ਪਾਉਣਗੇ।

5. ਵਿਦਿਆਰਥੀ ਪੰਜਾਬੀ ਭਾਸ਼ਾ ਤੇ ਆਪਣੀ ਪਕੜ ਮਜ਼ਬੂਤ ਕਰਨਗੇ ਅਤੇ ਇਸ ਦੀ ਕਲਾਤਮਕ ਅਤੇ ਆਦਰਸ਼ਕ ਵਰਤੋਂ ਕਰਦੇ ਹੋਏ ਭਾਵਾਂ ਅਤੇ ਵਿਚਾਰਾਂ ਦੀ ਰਚਨਾਕਾਰੀ ਕਰਨ ਵੱਲ ਰੁਚਿਤ ਹੋਣਗੇ।

Course Outcomes (COs)

B. Sc Math Hons - II
Semester-3rd

Code	Title of Course
BMH 301	Analysis-I
BMH 302	Group Theory
SC 304	Optimization Techniques-I
CS 305A	Data Structure
CS 305B	Software Lab-III
ELECTIVES	
BMH 303	Mathematical Methods
SC-306	Statistical Methods-I

FOUNDATION

Code	Title of Paper/Subject
ENG 307	English

B.Sc. Honrs. In Mathematics (Sem.-4)
CORE SUBJECTS

Code	Title of Course
BMH 401	Linear Algebra
BMH 402	Analysis-II
BMH 403	PDE and System of ODE
CS 405 A	Computer Graphics
CS 405B	Software Lab-IV

ELECTIVE

Code	Title of Course
SC 404	Optimization Techniques-II
SC-406	Statistical Methods-II

FOUNDATION

Code	Title of Course
EVS-407	Environmental and Road Safety Awareness*

BMH-301: Analysis-I)

CO-1: Develop the logical thinking to prove the basic results of analysis.

CO-2: Appreciate how abstract ideas in analysis can be applied to practical problems

CO-3: Understand many properties of the real line R including completeness and Archimedean property.

CO-4: Compare countable and uncountable sets.

CO-5: Illustrate metric space and complete metric space.

CO-6: Examine continuity and uniform continuity in context of metric space.

CO-7: Understand fixed point theorem contractions.

BMH-302: Group Theory

CO-1: Understand the importance of algebraic properties with regard to recognizing the mathematical objects called groups.

CO-2: Extend group structure to finite permutation groups .

CO-3: Explain the significance of the notions of cosets, normal subgroups, and quotient groups..

CO-4: Analyze consequences of Lagrange's theorem.

CO-5: Produce examples and counterexamples illustrating the mathematical concepts presented in the course.

BMH-303 : MATHEMATICAL METHODS

CO-1: Find series solutions of differential equations and gain knowledge about special functions.

CO-2: Identify, analyse and subsequently solve physical situations whose behaviour can be described by ordinary differential equations.

CO-3: Competence in solving applied problems which are linear and nonlinear form.

CO-4: Determine the solution of differential equations with initial and boundary value problems by choosing the most suitable method.

CO-5: Understand to formulate and solve complex problems of differential equations with techniques of Integral transform.

SC-304 Optimization Techniques-I

CO-1: Identify the goals and objectives of inventory management .

CO-2: Describe the importance of stocks in an organization and the reasons for holding stock.

CO-3: Understand the various selective inventory control techniques and its applications.

CO-4: Apply inventory models to analyse real world systems.

CO-5: Formulate and solve problems as networks using CPM and PERT techniques, to plan, schedule, and control project activities.

CO-6: To deal with the problems of multiple jobs and machines in a production line.

CO-7: Describe the formulation of simulation models and demonstrate their applications.

ENG-307 English

CO-1: Be proficient with the skill of communication.

CO-2: Learn work with their creative mind and influence their creative writing.

CO-3: Learn proper format of read and write verse, and will participate in poetry competitions.

CO-4: Use new words according to situation make their communication effective.

CO-5: Learn the use of exact English grammatical structure.

CO-6: learn the different modes of poetry like, meter, rhyme scheme, pitch, tone etc.

BMH 401: Linear Algebra

CO-1: Understand the concepts of Vector Spaces ,Linear Transformations ,Matrix Algebra in context of linear transformation and Determinants .

CO-2: Understand the inner product including Gram Schmidt orthogonalizationProcess .

CO-3: Apply computational techniques and algebraic skills essential for the study of linear Algebra.

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

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

BMH 402: Analysis II

CO-1: Understand the concept of Function of Bounded Variations ,Riemann Steiltjes Integration andRiemann Integration

CO-2: Understand Infinite seriesof real numbers and uniform convergence of sequence of functions

CO-3: Analyse and derive some of the basic definitions and theorems related to real analysis.

CO-4: Relate the concept of infinite series and Improper Integrals

CO-5: Apply these concepts to problems in physics, engineering, probability theory, Fourierseries, and so forth.

BMH 403 PDE and System of ODE

CO-1: Understand the methods and techniques to solve Ordinary differential equations and Partial differential equations .

CO-2: Understand the differences between Ordinary differential equations and Partial differential equations.

CO-3: Develop the ability to apply differential equations to significant applied and theortical problems.

CO-4: Apply fundamental principles of Ordinary and Partial Differential Equations for solving parabolic, hyperbolic and elliptic equations.

CO-5: Formulate mathematical models in the form of ordinary and partial differential equations to problems arising in physical, chemical and biological discipline.

SC-404: Optimization Techniques-II

CO-1: Understanding deeply the theoretical background of queueing systems.

CO-2: Understand and compute quantitative metrics of performance for queueing systems.

CO-3: Apply queueing models to analyze real world systems.

CO-4: Solve multi-level decision problems using dynamic programming method.

CO-5: Describe the applications of dynamic programming in real-world problems.

CO-6: Set up and solve dynamic optimization problems both analytically and numerically and demonstrate their working by hand.

Course Outcomes (COs)
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B.Sc. Hons Math (Semester-V)

Code	Title of Course
BHM 501	Algebra (Group and Ring Theory)
BHM 502	Calculus of several variables and Improper Integrals
BHM 503	Discrete Mathematics and Graph Theory
BHM 504	Mechanics- I
BHM 505	Linear Integral Equations

B.Sc. Hons Math(Semester-VI)

Code	Title of Course
BHM 601	Number Theory
BHM 602	Mechanics-II
BHM 603	Partial Differential Equations
BHM 604	Numerical Analysis
BHM 605	Tensor Analysis

BHM 501 : Algebra (Group and Ring Theory)
CO-1: Define and construct algebraic structures
CO-2: Analyse algebraic structures in details.
CO-3: Develop new structures based on given structures and compare the structures.
CO-4: Use fundamentals theorems to solve the problems.
CO-5: Provide rigorous proofs of propositions arising in the context of abstract algebra.

BHM 502 : Calculus of several variables and Improper Integrals
CO-1: Apply Fundamental theorems in the study of Calculus in Manifolds
CO-2: Classify and evaluate improper integrals of Type-I and Type-2.
CO-3: Apply Convergence Test to Improper integrals of both types.
CO-4: Understand the path criterion to prove that weather a limit exists or not and apply it to solve problems regarding limits.
CO-5: Evaluate integrals using the technique of Beta and Gamma Functions.
CO-6: Understand the concept of measure of bounded interval in the classical context.

BHM 503: Discrete Mathematics and Graph Theory
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.

BHM 504 :Mechanics-1
CO-1: Understand the necessary conditions for equilibrium of particles acted upon by number of forces.
CO-2: Understand the reduction of force system to a resultant force and a resultant couple.
CO-3: Define and determine the centre of gravity of some materialistic systems.
CO-4: Demonstrate the concept of friction and identify types of friction.
CO-5: Apply the theorems of statics to solve the real life problems.

BHM-505 : Linear Integral Equations
CO-1: Understand the relation between linear differential equation and Volterra's equation and convert one type into another.
CO-2: Understand the difference between Volterra and Fredholm Integral Equations, First kind and Second kind.
CO-3: Apply the techniques which go beyond the usual differential theoretic.

CO-4: Apply Fourier transformations for solving a large range of differential and integral equations.

CO-5: Analyze the safety and stability of the dam during an earthquake

CO-6: Understand Schwarz's inequality and its applications.

BHM 601 :Number Theory

CO1: Understand the concepts of Divisibility, Congruences, Residue class, Polynomial congruences, Primitive roots and Arithmetical functions.

CO2: Understand the concepts of Quadratic residues, Quadratic reciprocity, Rational approximation, Continued fractions.

CO3: Solve linear congruences and The Diophantine equations.

CO4: Use arithmetical functions in the area of Mathematics.

CO5: Apply the laws and concepts of number theory to solve the real life problems

BHM 602: Mechanics-II

CO1: Understand the laws of motion. dynamics involving a single particle like projectile motion, Simple Harmonic function, pendulum motion and related problems.

CO2: Understand the concepts of work, power, energy , momentum and relative motion

CO3: Draw and write position and velocity vectors for relative motion.

CO4: Apply the laws of motion to solve physical problems

CO5: Use and derive some of the basic definitions and theorems related to dynamics.

BHM 603: Partial Differential Equations

CO1: Understand the methods and techniques to solve Ordinary differential equations and Partial differential equations .

CO2: Develop the ability to apply differential equations to significant applied and theortical problems.

CO3: Recognizes the major classification of PDE and qualitative differences between the classes of equations..

CO4: Classify fundamental principles of PDEs for solving parabolic, hyperbolic and elliptic equations.

CO5: Formulate mathematical models in the form of ordinary and partial differential equations to problems arising in physical, chemical and biological discipline.

BHM 604:Numerical Analysis

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.

BHM 605: Tensor Analysis

CO1: Understand the concepts of tensor variables and its difference from scalar or vector variable.

CO2: Understand the concepts curvilinear coordinates and Christoffel symbols

CO3: Explain usefulness of the tensor analysis in Physics and Engineering.

CO4: Derive base vectors, metric tensors and strain tensors in an arbitrary coordinate system.

CO5: Use the concepts of tensors in differential geometry.