JLN Govt. College Haripur (Manali)

Programme Overview Mathematics

Department of Mathematics

Year of Establishment: 2006

Programme Offered: UG

No. of Teaching Posts

Sanctioned: 01

Filled: 01

Faculty Profile:

Sl. No.	Name	Qualification	Designation	Teaching experience
01	Mr. Rajesh Singh	M.Sc., M.Phil.	Assistant Professor	11 Years

Course Structure

U.G. Yearly Programme (w.e.f. 2018–19)

Year	Course Type	Course Code	Title	Credits
1st	Core Course	MATH101TH	Differential Calculus	6
	Core Course	MATH102TH	Differential Equations	6
2nd	Core Course Core Course	MATH201TH	Real Analysis	6
		MATH202TH	Algebra	6
	SEC I (Choose any one from the given three)	MATH307TH	Logic and Sets	4
		MATH308TH	Analytic Geometry	4
		MATH309TH	Integral Calculus	4
	SEC 2 (Choose any one from the given three)	MATH310TH	Vector Calculus	4
		MATH311TH	Boolean Algebra	4
		MATH312TH	Number Theory	4
	DSE 1A (Choose any one from the given three)	MATH301TH	Matrices	6
		MATH302TH	Mechanics	6
		MATH303TH	Linear Algebra	6
	DSE 1B (Choose	MATH304TH	Numerical Methods	6

	any one from the given three)	MATH305TH MATH306TH	Complex Analysis Linear Programming	6 6
3rd	SEC 3 (Choose any one from the given three)	MATH313TH MATH314TH MATH315TH	Probability and Statistics Mathematical Finance Mathematical Modelling	4 4 4
	SEC 4 (Choose any one from the given three)	MATH316TH MATH317TH MATH318TH	Theory of Equations Transportation and Game Theory Graph Theory	4 4 4

Name of Programme: (B.Sc. Mathematics / B.A. Mathematics)

Mathematics Programme:

According to German Mathematician Carl Friedrich Gauss "Mathematics is the queen of the science". Mathematics is a fundamental part of human thought, logic and integral to attempts at understanding the world and ourselves. Mathematics provides an effective way of building mental discipline and encourages logical reasoning and mental rigor. It provides foundational knowledge and skills for other subjects such as sciences, art, economy, etc. Thus there arises the need for its detailed study by adopting a systematic programme.

Programme Objectives:

- Develop the ability to think critically, logically and analytically and to use mathematical reasoning in everyday life.
- Create deep interest in learning mathematics.
- Communicate mathematics effectively by written, computational and graphic means.
- Develop broad and balanced knowledge and understanding of definitions, concepts, principles and theorems.
- The program covers the full range of mathematics from Classical Calculus to modern Number Theory. Thus it provides learners sufficient knowledge and skills to enable them undertake further studies in mathematics and its allied areas on multiple disciplines.
- Pursuing a degree in mathematics introduces the students to a number of interesting and useful ideas and helps them prepare for job exams in the field of education, research, government sector, business sector and industry.

Programme Outcomes and Graduate Attributes:

Disciplinary knowledge: Capability of demonstrating comprehensive knowledge of mathematics and understanding of one or more disciplines which form a part of an undergraduate programme of study.

Communications skills:

i. Ability to communicate various concepts of mathematics effectively using examples and their geometrical visualizations.
ii. Ability to use mathematics as a precise language of communication in other branches of human knowledge.
iii. Ability to communicate long standing unsolved problems in mathematics.
iv. Ability to show the importance of mathematics as precursor to various scientific developments since the beginning of the civilization.
v. Ability to explain the development of mathematics in the civilizational context and its role as queen of all sciences.

Critical thinking and analytical reasoning:

i. Ability to employ critical thinking in understanding of the mathematical concepts.
ii. Ability to analyze the results and apply them in various problems appearing in different branches of mathematics.

Problem solving:

i. Capability to solve problems in computer graphics using concepts of linear algebra.
ii. Capability to solve various models such as growth and decay models, radioactive decay model, drug assimilation, LCR circuits and population models using techniques of differential equations.
iii. Ability to solve linear system of equations, linear programming problems and network flow problems.
iv. Ability to provide new solutions using the domain knowledge of mathematics acquired during this programme.

Research-related skills:

i. Capability for inquiring about appropriate questions relating to the concepts in various fields of mathematics.
ii. To know about the advances in various branches of mathematics.

Information/digital literacy:

i. Capability to use appropriate softwares to solve system of equations and differential equations.

Self-directed learning:

Ability to work independently and do in-depth study of various notions of mathematics.

Moral and ethical awareness/reasoning:

Ability to identify unethical behavior such as fabrication, falsification or misrepresentation of data and adopting objective, unbiased and truthful actions in all aspects.

Lifelong learning:

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

Programme Specific Outcomes:

DSE (Discipline Specific Elective):

Choices from DSE provide the students with liberty of exploring his interest within the Mathematics. They enhance the ability of learners to apply the knowledge and skills acquired during the programme to solve specific theoretical and applied problems in mathematics.

SEC (Skill Enhancement Courses):

These courses enable the student to acquire the skill relevant to Mathematics. They familiarize the students with suitable tools of mathematical analysis to handle issue and problems in mathematics and related sciences.

Let us have a look on different courses of this programme: -

MATH101TH: Differential Calculus: -

This course will enable the students to assimilate the notions of limits, continuity, differentiability of functions at a point. Sketch curves in Cartesian and Polar co-ordinate systems, expansion of functions using Maclurin's and Taylor's theorems, curvature, asymptotes and curve tracing.

MATH102TH: Differential Equations: -

It will enable learners to learn various techniques of getting exact solutions of solvable first order differential equations and linear differential equations of higher order. They will be introduced to partial differential equations and their solutions.

MATH201TH: Real Analysis: -

Learners will get concept of real line, completeness property, real sequences, infinite series, uniform convergence and power series.

MATH202TH: Algebra: -

Students will learn about algebraic structures, groups, subgroups, their types; They will be also introduced to rings, subrings, integral domains and fields.

MATH309TH: Integral Calculus: -

This SEC will lead expertise in integration, rectification and quadrature. Students will learn to handle double and triple integrals.

MATH310TH: Vector Calculus: -

It will teach students to find gradient divergence, curl, vector integration and provides a peep into the beautiful world of Gauss, Green and Stokes theorem.

MATH303TH: Linear Algebra: -

Students will learn about vector spaces, sub-spaces, linear combination of vectors, linear span, Linear independence, basis and dimensions. They will also learn about linear transformation, null space, rank and nullity, dual space, eigen values and eigen vectors, isomorphism and isomorphism theorems.

MATH304TH: Numerical Methods: -

This course will help in administering numerical methods for solutions of non-linear equations, iterative methods for solution of linear equations. Students will know about interpolation, differential operators, numerical differentiation and numerical integration methods.

MATH313TH: Probability and Statistics: -

This course will change one's sight of viewing different experiments by defining sample space, probability, providing in depth knowledge of different probability distributions and joint probability distribution functions.

MATH317TH: Transportation and Game Theory: -

No mathematics programme is complete without operations research. Operations research is that branch of mathematics which helps in optical decision making in various business situations. So, this SEC deals with solution of transportation problems, assignment problems and game theory.