CURRICULAMANDITSRELEVANCETOLOCAL /NATIONAL /REGIONAL/GLOBAL NEEDS

DEPARTMENT NAME–B.Sc MATHEMATICS

SL.NO	Course Code	Course Name	Need (Local/National/ Regional/Global)	Descriptions
1.	C1	Calculus	Global	This course helps develop problem-solving and analytical skills applicable to various scientific and business contexts.
2.	C2	Algebra	Global	This course develops a deep understanding of complex numbers, linear algebra, and abstract algebra, providing the mathematical foundation to solve real-world problems in fields like engineering, physics, and computer science
3.	GE-1.1	Object Oriented Programming in C++	Global	This course teaches Object-Oriented Programming (OOP) concepts in C++, including classes, inheritance, polymorphism, and operator overloading, to equip students with skills for designing efficient and reusable software.
4.	GE-1.2	Finite Element Methods	Global	This course introduces the finite element method (FEM), comparing it with finite difference methods and covering applications in solving differential equations, including the use of linear and quadratic elements, interpolation functions, and numerical integration for complex geometries.
5.	GE 1	Mechanics	Global	This course develops a comprehensive understanding of classical mechanics, differential equations, and fundamental concepts in physics, including motion, energy conservation, gravitation, and elasticity, preparing students for advanced studies in physics, engineering, and related fields.
6.	C3	Real Analysis	Global	This course develops a thorough understanding of real analysis, focusing on the properties of real numbers, sequences, and series, with key concepts such as convergence, Cauchy

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				sequences, and various convergence tests, essential for advanced studies in mathematics and its applications.
7.	C4	Differential Equations	Global	This course develops an understanding of differential equations and mathematical modeling, covering topics such as general and particular solutions, linear and Bernoulli equations, compartmental models, and applications in fields like population dynamics, drug assimilation, and environmental studies, providing tools for analyzing real-world systems.
8.	GE2.1	Mathematical Finance	Global	This course develops skills in financial analysis, covering topics like NPV, IRR, portfolio theory, and CAPM for evaluating investments and managing risk.
9.	GE2.2	Econometrics	Global	This course develops statistical analysis skills, focusing on hypothesis testing, regression models, and detecting issues like multicollinearity and heteroscedasticity.
10.	GE 2	Electricity and magnetism	Global	This course develops knowledge of vector analysis, electrostatics, magnetism, and electromagnetic waves, crucial for understanding electric and magnetic fields.
11.	C5	Theory of Real Functions	Global	This course develops a deep understanding of limits, continuity, differentiability, and Taylor's theorem, providing essential tools for analyzing and approximating functions.
12.	C6	Group Theory 1	Global	This course develops knowledge of group theory, including symmetries, subgroups, homomorphisms, and isomorphisms, essential for understanding algebraic structures..
13.	C7	PDE and Sytstems of ODE	Global	This course develops techniques for solving partial differential equations, including methods for heat, wave, and Laplace equations, and linear differential systems.
14.	GE 3.1	Cryptography and Network Security	Global	This course develops skills in public key cryptography, network security, digital signatures, and firewall design to protect communication systems.

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15.	GE 3.2	Information Security	Global	This course develops understanding of security concepts, cryptography, digital signatures, and security mechanisms to protect systems from threats like viruses and intruders.
16.	SEC 1.1	Logic and Sets	Global	This course develops understanding of logic, set theory, and relations, essential for mathematical reasoning and problem-solving.
17.	SEC 1.2	Computer Graphics	Global	This course develops skills in computer graphics, focusing on display systems, drawing algorithms, and 2D viewing techniques.
18.	C8	Numerical Methods	Global	This course develops numerical methods for solving equations, systems, and differential equations, with a focus on error analysis and convergence.
19.	C9	Riemann Integration and Series of Functions	Global	This course develops knowledge of Riemann integration, improper integrals, convergence of functions, and power series.
20.	C10	Ring Theory and Linear algebra 1	Global	This course develops knowledge of rings, ideals, vector spaces, linear transformations, and isomorphisms, focusing on algebraic structures and their properties.
21.	GE 4.1	Applications of Algebra	Global	This course explores balanced incomplete block designs, coding theory, symmetry groups, special matrices, and applications of linear transformations.
22.	GE 4.2	Combinatorial Mathematics	Global	This course develops students' problem-solving skills in combinatorics, mathematical reasoning, and the ability to apply counting methods to complex real-world scenarios.
23.	SEC 2.1	Graph Theory	Global	It helps students understand graph structures and apply algorithms for solving real-world problems in optimization, networking, and routing
24.	SEC 2.2	Operating System : LINUX	Global	This course equips students with comprehensive Linux knowledge, from system architecture to resource management, preparing them for local, national, and international roles

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				in IT and system administration.
25.	C 11	Multivariate Calculus	Global	This course provides advanced multivariable calculus skills, needed globally in fields like engineering, physics, and data science.
26.	C 12	Group Theory II	Global	This course provides students with deep knowledge of group theory, including automorphisms, group actions, Sylow's theorems, and applications, essential for advanced studies in mathematics and theoretical physics,.
27.	DSE 1.1	Portfolio Optimization	Global	This course provides students with essential knowledge in financial markets, portfolio optimization, risk management, and capital asset pricing, preparing them for global careers in finance, investment analysis, and portfolio management.
28.	DSE 1.2	Number Theory	Global	This course covers key number theory concepts, including Diophantine equations, cryptography, and prime properties, crucial for global careers in mathematics and cybersecurity.
29.	DSE 1.3	Analytical Geometry	Global	This course covers techniques for sketching and analyzing conic sections and quadric surfaces, essential for global careers in mathematics, engineering, and computer graphics.
30.	DSE 2.1	Industrial Mathematics	Global	This course provides students with knowledge of medical imaging, inverse problems, and CT scan mathematics, equipping them with essential skills for global careers in medical physics, engineering, and data science.
31.	DSE 2.2	Boolean Algebra and Automata Theory	Global	This course provides students with essential knowledge in formal languages, automata theory, Boolean algebra, and computability, preparing them for global careers in computer science, software engineering, and theoretical research

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32.	DSE 2.3	Probability and Statistics	Global	This course provides students with comprehensive knowledge in probability theory, random variables, distributions, and statistical methods, preparing them for global careers in data science, finance, and applied mathematics.
33.	C13	Metric Spaces and Complex Analysis	Global	This course equips students with a deep understanding of metric spaces, continuity, complex analysis, and analytic functions, enabling them to tackle advanced mathematical problems and applications in global industries
34.	C14	Ring Theory and Linear Algebra II	Global	This course provides students with advanced knowledge in polynomial rings, linear algebra, and operator theory, preparing them for global careers in mathematics, physics, and engineering.
35.	DSE3.1	Theory of Equations	Global	This course equips students with advanced skills in polynomial equations and root analysis, essential for careers in mathematics and engineering.
36.	DSE3.2	Bio-Mathematics	Global	This course equips students with mathematical modeling techniques in biology, preparing them for careers in bioinformatics, ecology, and epidemiology.
37.	DSE3.3	Linear Programming	Global	This course teaches linear programming, optimization techniques, and game theory, preparing students for careers in operations research and applied mathematics.
38.	DSE4.1	Mathematical Modeling	Global	This course equips students with knowledge of differential equations, Monte Carlo simulation, and optimization modeling, providing essential tools for solving real-world problems in engineering, physics, and applied mathematics.
39.	DSE4.2	Mechanics	Global	This course covers mechanics, force systems, friction, and energy conservation for careers in engineering and physics.
40.	DSE4.3	Differential Geometry	Global	This course covers differential geometry, including curves, surfaces, and tensors, for careers in physics and

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