

CURRICULUM & SYLLABUS



Bachelor of Science (Hons.) Mathematics

OR

**Bachelor of Science (Hons.) Mathematics with
Research/ Academic Projects**

(4 Year Undergraduate Degree Program)

**Under UGC Framework - 2022 based on National Education
Policy – 2020**

(w.e.f. Academic Year 2023-24)

**DEPARTMENT OF MATHEMATICS
FACULTY OF SCIENCE AND HUMANITIES
SRM UNIVERSITY DELHI-NCR, SONEPAT
Plot No.39, Rajiv Gandhi Education City, Sonapat
Haryana-131029**

SRM UNIVERSITY DELHI-NCR, SONEPAT (HARYANA)

VISION

SRM University Haryana aims to emerge as a leading World Class Institution that creates and disseminates knowledge upholding the highest standards of instruction in Engineering & Technology, Science & Humanities, Commerce, Management, Hotel Management & Medicine & Health Science. Along with academic excellence, our curriculum imparts integrity and social sensitivity so that our graduates may best serve the Nation and the World.

MISSION

- To create a diverse community campus that inspires freedom and innovation.
- Strengthen Excellence in educational & skill development processes
- Continue to build productive international alliances
- Explore optimal development opportunities available to students and faculty
- Cultivate an exciting and rigorous research environment

DEPARTMENT OF MATHEMATICS

VISION

The broad vision of the Department is to carry out high quality research in the different areas of Mathematics, Statistics and Computing so that we can produce proficient graduates, engineers, and scientists to contribute significantly in the development of the society. Excellence, integrity, innovation, entrepreneurship, and leadership are priorities of the Department. The vision is to become a leading department of global excellence in research and education in all discipline of Mathematics.

MISSION

The Department supports the University's mission by empowering students to:

- Provide excellent knowledge of Mathematical Sciences as well as Statistics for suitable career and groom them for institutional, state, national and international recognition.
- Discover, mentor, and nurture mathematically inclined students, and provide them a supportive environment that fosters intellectual growth.
- Train the students for interdisciplinary applications and research.
- Train the students with Mathematical and Statistical tools for industries as well as research organizations
- Provide professional services based on our diverse mathematical and statistical expertise
- The scientific, technical, and educational community.
- Achieve excellence in the subject as well as overall development of the student to strive in a competitive society.

GRADUATE EMPLOYMENT ATTRIBUTES

EA-1: Sound knowledge and understanding of the domain area.

EA-2: Analytical & critical thinking and problem-solving skills.

EA-3: Scientific Temperament towards Research & Innovation for the Betterment of Society.

EA-4: Efficient Communication & Presentation Skills.

EA-5: Dependability, reliability, responsibility, and independent leadership abilities.

PROGRAM EDUCATIONAL OBJECTIVES

PO-1: The programme covers the full range of mathematics, from classical Calculus to modern Cryptography, Information Theory, and Statistical computation.

PO-2: The course lays a structured foundation of Pure & Applied Mathematics.

PO-3: An exceptionally broad range of topics covering: Linear Algebra, Metric spaces, Statistics, Linear Programming, Numerical Analysis, Mathematical Finance, Coding theory, Mechanics, and Bio- Mathematics cater to varied interests and ambitions.

PO-4: Skill enhancement Courses enable the student acquire the skill relevant to the main subject.

PO-5: The well-structured programme empowers the student with the skills and knowledge leading to enhanced career opportunities in industry, commerce, education, finance and research.

PROGRAM LEARNING OUTCOMES

PLO-1: Communicate mathematics effectively by written, computational and graphic means.

PLO-2: Create mathematical ideas from basic axioms.

PLO-3: Estimate the hypothesis, theories, techniques, and proofs provisionally.

PLO-4: Utilize mathematics to solve theoretical and applied problems by critical understanding, analysis, and synthesis.

PLO-5: Identify applications of mathematics in other disciplines and in the real-world, leading to enhancement of career prospects in a plethora of fields and research.

MAPPING MATRIX BETWEEN POs & PLOs:

PEO \ PLO	PLO01	PLO02	PLO03	PLO04	PLO05
PEO01	✓				
PEO02		✓			
PEO03		✓	✓		
PEO04				✓	
PEO05					✓

**Four Year B.Sc. Mathematics Programme Structure in alignment with
NEP-2020 (UGC guidelines) in the Department of Mathematics, SRMUH
w.e.f. Academic Year 2023-24**

S. No.	Broad Category of Courses	No. of Courses	Credits	%
1	Major Course (Discipline Specific Course DSC)	24	$24 \times 4 = 96$	53.03
2	Minor Stream Course (MSC)	7	$7 \times 4 = 28$	15.46
3	Multi-Disciplinary Course (MDC)	3	$3 \times 3 = 9$	4.97
4	Ability Enhancement course (AEC)	4	$4 \times 2 = 8$	4.41
5	Skill Enhancement Course (SEC)	10	$10 \times 1 = 10$	5.52
6	Value Added Course (VAC)	3	$3 \times 2 = 6$	3.31
7	Project / Dissertation	2	12	6.62
8	Live Projects/Vocational Courses/Summer Internship	3	$3 \times 4 = 12$	6.62
Total		56	181	100

**Four Year B.Sc. Mathematics Programme Credit Structure Semester-wise in alignment with NEP-2020 (UGC guidelines) in the Department of Mathematics, SRMUH
w.e.f. Academic Year 2023-24**

Semester	Broad Category of Courses								Total Credits	Remarks
	Major	IDC/ MSC	MDC	AEC	SEC	VAC	RP/Dissertation	Live Projects/Vocational Courses/Summer Internship		
I	8	4	3	2	2	2	-	-	21	Certificate: 46 Credits
II	8	4	3	2	2	2	-	4	25	
III	12	4	3	2	2	-	-	-	23	Diploma: 95 Credits
IV	12	4	-	2	2	2	-	4	26	
V	16	4	-	-	2	-	-	-	22	Degree: 145 Credits
VI	16	8	-	-	-	-	-	4	28	
VII	12	6*	-	-	-	-	6#	-	18	Honours / Honours with Research: 181 Credits
VIII	12	6*	-	-	-	-	6#	-	18	
3 Years	72	28	9	8	10	6	0	12	145	
%	49.65	19.31	6.20	5.51	6.89	4.13	0.00	8.27	100.00	
4 Years	96	28	9	8	10	6	12	12	181	
%	53.03	15.46	4.97	4.41	5.52	3.31	6.62	6.62	100.00	
*Students pursuing Honours will do 1 MSC course of 4 Credits, 2 MSC courses of 2 credits and 1 minor project of 4 credits in lieu of a Research Project/Dissertation. #Students pursuing Honours with Research would complete 2 credits of Research Methodology, 4 credits of minor dissertation and 6 Credits of major Research/Dissertation.										

SEMESTER – I

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1	23MABS101	Calculus	3	1	0	4	Major
2	23MABS102	Algebra I	3	1	0	4	Major
3	23MABS103	Object Oriented Programming using C++	3	0	0	3	MSC
4	23MABS103L	Object Oriented Programming using C++ Lab	0	0	2	1	MSC
5		MDC – I	3	0	0	3	MDC
6		Functional English – I	2	0	0	2	AEC
7		Effective Communication Skills	0	0	2	1	SEC (Soft)
8		Digital Literacy & IT Skills	0	0	2	1	SEC (Tech)
9		Indian Constitution & Polity	2	0	0	2	VAC
TOTAL			16	2	6	21	

L – Lectures, T- Tutorial, P- Practical

- **Major – Major Course**
- **MSC - Minor Stream Course**
- **MDC - Multidisciplinary Course**
- **AEC - Ability Enhancement Course**
- **SEC (Soft) - Skill Enhancement Course (Soft Skills)**
- **SEC (Tech) - Skill Enhancement Course (Technical Skills)**
- **VAC – Value Added Course**

SEMESTER – II

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1	23MABS201	Algebra II	3	1	0	4	Major
2	23MABS202	Vector Analysis	3	1	0	4	Major
3	23MABS203	Data Structure	3	0	0	3	MSC
4	23MABS203L	Data Structure Lab	0	0	2	1	MSC
5		MDC – II	3	0	0	3	MDC
6		Functional English – II	2	0	0	2	AEC
7		Teamwork & Interpersonal Skills	0	0	2	1	SEC (Soft)
8		Advanced Excel Skills	0	0	2	1	SEC (Tech)
9		Environmental Protection & Sustainable Development	2	0	0	2	VAC
10	23SEC271	Live Projects/Vocational Courses/Summer Internship	-	-	-	4	SIP
TOTAL			16	2	6	25	

L – Lectures, T- Tutorial, P- Practical

On Exit, students shall be awarded UG Certificate (Mathematics) on securing the requisite 46 Credits on completion of II-Semester.

SEMESTER – III

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1	23MABS301	Real Analysis	3	1	0	4	Major
2	23MABS302	Ordinary Differential Equations	3	1	0	4	Major
3	23MABS303	Theory of Equations	3	1	0	4	Major
4	23MABS304	Integral Transforms	3	1	0	4	MSC
5		MDC – III	3	0	0	3	MDC
6		Hindi – I / German – I / French – I	2	0	0	2	AEC
7		Presentation Skills	0	0	2	1	SEC (Soft)
8		Statistical Analysis with SPSS	0	0	2	1	SEC (Tech)
TOTAL			17	4	4	23	

L – Lectures, T- Tutorial, P- Practical

SEMESTER – IV

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1	23MABS401	Multivariate Calculus	3	1	0	4	Major
2	23MABS402	Mechanics	3	1	0	4	Major
3	23MABS403	Partial Differential Equations	3	1	0	4	Major
4	23MABS404	Operations Research – I	3	1	0	4	MSC
5		Hindi – II / German – II / French – II	2	0	0	2	AEC
6		Professional Skills	0	0	2	1	SEC (Soft)
7		R Language Programming	0	0	2	1	SEC (Tech)
8		Sports, Yoga & Fitness	0	0	4	2	VAC
9	23SEC471	Live Projects/Vocational Courses/Summer Internship	-	-	-	4	SIP
TOTAL			14	4	8	26	

L – Lectures, T- Tutorial, P- Practical, C- credits

On Exit, students shall be awarded UG Diploma (Mathematics) on securing the requisite 95 Credits on completion of IV-Semester.

SEMESTER – V

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1	23MABS501	Number Theory	3	1	0	4	Major
2	23MABS502	Descriptive Statistics	3	0	0	3	Major
3	23MABS502L	Descriptive Statistics Lab	0	0	2	1	Major
4	23MABS503	Operations Research – II	3	1	0	4	Major
5	23MABS504	Metric Spaces	3	1	0	4	Major
6	23MABS505	Riemann Integration and Series of Functions	3	1	0	4	MSC
7		Aptitude & Reasoning	0	0	2	1	SEC (Soft)
8		Programming with MATLAB	0	0	2	1	SEC (Tech)
TOTAL			15	4	6	22	

L – Lectures, T- Tutorial, P- Practical

SEMESTER – VI

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1	23MABS601	Topology	3	1	0	4	Major
2	23MABS602	Numerical Methods	3	0	0	3	Major
3	23MABS602L	Programming of Numerical Methods using MATALB	0	0	2	1	Major
4	23MABS603	Discrete Mathematics	3	1	0	4	Major
5	23MABS604	Complex Analysis	3	1	0	4	Major
6	23MABS605	Fuzzy Set Theory	3	1	0	4	MSC
7	23MABS606	Differential Geometry	3	1	0	4	MSC
8	23SEC671	Live Projects/Vocational Courses/Summer Internship	-	-	-	4	SIP
TOTAL			18	5	2	28	

L – Lectures, T- Tutorial, P- Practical

On Exit, students shall be awarded B.Sc. Degree (Mathematics) on securing the requisite 145 Credits on completion of VI-Semester.

SEMESTER – VII

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1	23MABS701	Probability and Probability Distributions	3	0	0	3	Major
2	23MABS701L	Probability and Probability Distributions Lab	0	0	2	1	Major
3	23MABS702	Measure Theory and Integration	3	1	0	4	Major
4	23MABS703	Graph Theory and its Applications	3	1	0	4	Major
5	23MABS704	Cryptography	2	0	0	2	MSC for Honours*
6	23MABS705	Statistical Inference	3	0	0	3	MSC for Honours*
7	23MABS705L	Statistical Inference Lab	0	0	2	1	MSC for Honours*
8	23RMBS710	Research Methodology	2	0	0	2	MSC for RP**
9	23MABS777	Minor Project / Minor Dissertation	-	-	-	4	Research Project/Dissertation for RP**
TOTAL			16	2	2	18	

L – Lectures, T- Tutorial, P- Practical

*** Students pursuing Honours will do 1 Course of 4 Credits and 1 course of 2 credits in lieu of Research Project in 7th Semester.**

**** Students pursuing Honours with Research will do Research Methodology of 2 Credit and Research Project/Dissertation of 4 Credits.**

SEMESTER – VIII

S.No.	Course Code	Course Title	L	T	P	Credits	Course Category
1	23MABS801	Functional Analysis	3	1	0	4	Major
2	23MABS802	Special Functions	3	1	0	4	Major
3	23MABS803	Combinatorial Mathematics	3	1	0	4	Major
4	23MABS804	Classical Mechanics	2	0	0	2	MSC for Honours*
5		Minor Project / Minor Dissertation	0	0	0	4	For students pursuing Honours*
6	23MABS871	Major Project / Major Dissertation #	-	-	-	6	Research Project/Dissertation for RP #
TOTAL			14	4	0	18	

L – Lectures, T- Tutorial, P- Practical

* Students pursuing Honours will do 1 course of 2 Credit and Minor Project of 4 credits in lieu of research project in 8th Semester
Students pursuing Honours with research would complete 6 Credits of Research/Dissertation in the 8th Semester.

On Exit, students shall be awarded B.Sc. (Mathematics) (Honours) or (Honours with Research) after securing the requisite 181 Credits on completion of VIII – Semester.

**List of Major Courses offered to
Four Year B.Sc. Mathematics programme in the Department of Mathematics
w.e.f. Academic Year 2023-24**

S No	Semester	Course Code	Course Title	L	T	P	Credits
1	I	23MABS101	Calculus	3	1	0	4
2		23MABS102	Algebra – I	3	1	0	4
3	II	23MABS201	Algebra – II	3	1	0	4
4		23MABS202	Vector Analysis	3	1	0	4
5	III	23MABS301	Real Analysis	3	1	0	4
6		23MABS302	Ordinary Differential Equations	3	1	0	4
7		23MABS303	Theory of Equations	3	1	0	4
8	IV	23MABS401	Multivariate Calculus	3	1	0	4
9		23MABS402	Mechanics	3	1	0	4
10		23MABS403	Partial Differential Equations	3	1	0	4
11	V	23MABS501	Number Theory	3	1	0	4
12		23MABS502	Descriptive Statistics	3	1	0	4
13		23MABS503	Operations Research – II	3	1	0	4
14		23MABS504	Metric Spaces	3	1	0	4
15	VI	23MABS601	Topology	3	1	0	4
16		23MABS602	Numerical Methods	3	0	0	3
		23MABS602L	Programming of Numerical Methods using MATALB	0	0	2	1
17		23MABS603	Discrete Mathematics	3	1	0	4
18		23MABS604	Complex Analysis	3	1	0	4
19	VII	23MABS701	Probability and Probability Distributions	3	0	0	3
		23MABS701L	Probability and Probability Distributions Lab	0	0	2	1
20		23MABS702	Measure Theory and Integration	3	1	0	4
21		23MABS703	Graph Theory and its Applications	3	1	0	4
22	VIII	23MABS801	Functional Analysis	3	1	0	4
23		23MABS802	Special Functions	3	1	0	4
24		23MABS803	Combinatorial Mathematics	3	1	0	4

**List of Minor Stream Courses (MSC) offered to
Four Year B.Sc. Mathematics programme in the Department of Mathematics
w.e.f. Academic Year 2023-24**

S. No	Course code	Course title	L	T	P	Credits
1	23MABS103	Object Oriented Programming using C++	3	0	0	3
	23MABS103	Object Oriented Programming using C++ Lab	0	0	2	1
2	23MABS203	Data Structure	3	0	0	3
	23MABS203L	Data Structure Lab	0	0	2	1
3	23MABS304	Integral Transform	3	1	0	4
4	23MABS404	Operations Research – I	3	1	0	4
5	23MABS505	Riemann Integration and Series of Functions	3	1	0	4
6	23MABS605	Fuzzy Set Theory	3	1	0	4
7	23MABS606	Differential Geometry	3	1	0	4
8	23MABS704	Cryptography	2	0	0	2
	23MABS 705	Statistical Inference	3	0	0	3
	23MABS 705L	Statistical Inference Lab	0	0	2	1
9	23MABS804	Classical Mechanics	2	0	0	2
10	23RMBS710	Research Methodology	2	0	0	2

**List of Multidisciplinary Courses (MDC) offered to
Four Year B.Sc. Mathematics programme in the Department of Mathematics
w.e.f. Academic Year 2023-24**

Cat.	Code	Course Name	L	T	P	Credits
MDC I		Renewable Energy Sources	3	0	0	3
		Hybrid Electric Vehicle	3	0	0	3
		IPR in Business	3	0	0	3
		Library Information Sciences & Media Literacy	3	0	0	3
		Management Process & Organizational Behaviour	3	0	0	3
MDC II		Introduction to Bio-engineering	3	0	0	3
		Introduction to Robotics	3	0	0	3
		Psychology and Emotional Intelligence	3	0	0	3
		Indian Economy	3	0	0	3
		Creating an Entrepreneurial Mind	3	0	0	3
MDC III		Arduino Based Programming	3	0	0	3
		Electoral Literacy in India	3	0	0	3
		Personal Financial Planning	3	0	0	3
		Interior Design	3	0	0	3

**List of Ability Enhancement Courses (AEC) offered to
Four Year B.Sc. Mathematics programme in the Department of Mathematics
w.e.f. Academic Year 2023-24**

S. No.	Code	Course Name	L	T	P	Credits
1		Functional English – I	2	0	0	2
2		Functional English – II	2	0	0	2
3		Hindi – I / German – I / French – I	2	0	0	2
4		Hindi – II / German – II / French – II	2	0	0	2

**List of Value-Added Courses (VAC) offered to
Four Year B.Sc. Mathematics programme in the Department of Mathematics
w.e.f. Academic Year 2023-24**

S. No.	Code	Course Name	L	T	P	Credits
1		Indian Constitution & Polity	2	0	0	2
2		Environment Protection & Sustainable Development	2	0	0	2
3		Sports, Yoga & Fitness	0	0	4	2

**List of Skill Enhancement Courses (SEC) offered to
Four Year B.Sc. Mathematics programme in the Department of Mathematics
w.e.f. Academic Year 2023-24**

Courses on Soft Skills

S. No.	Code	Course Name	L	T	P	Credits
1		Effective Communication Skills	0	0	2	1
2		Teamwork & Interpersonal Skills	0	0	2	1
3		Presentation Skills	0	0	2	1
4		Professional Skills	0	0	2	1
5		Aptitude & Reasoning	0	0	2	1

Courses on Technical Skills

S. No.	Code	Course Name	L	T	P	Credits
1		Digital Literacy & IT Skills	0	0	2	1
2		Advanced Excel Skills	0	0	2	1
3		Statistical Analysis with SPSS	0	0	2	1
4		R Language Programming	0	0	2	1
5		Programming with MATLAB	0	0	2	1