

# **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  
39, Rajiv Gandhi Education City, Sonapat Haryana-1310**

## **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

## **SCIENCE 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	$24 \times 4 = 96$	52.8
2	Minor Stream Course (MSC)	7	$7 \times 4 = 28$	15.4
3	Multi-Disciplinary Course (MDC)	3	$3 \times 3 = 9$	5
4	Ability Enhancement course (AEC)	3	$3 \times 3 = 9$	5
5	Skill Enhancement Course (SEC)	10	$10 \times 1 = 10$	5.5
6	Value Added Course (VAC)	3	$3 \times 2 = 6$	3.3
7	Project / Dissertation	2	$4 + 6 = 10$	6.6
8	Live Projects/Vocational Courses/Summer Internship	3	$3 \times 4 = 12$	6.6
<b>Total</b>		<b>56</b>	<b>182</b>	<b>100</b>

**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	3	2	2	-	-	22	Certificate: 48 Credits
II	8	4	3	3	2	2	-	4	26	
III	12	4	3	3	2	-	-	-	24	Diploma: 96 Credits
IV	12	4	-	-	2	2	-	4	24	
V	16	4	-	-	2	-	-	-	22	Degree: 146 Credits
VI	16	8	-	-	-	-	-	4	28	
VII	12	2*	-	-	-	-	4#	-	18	Honours / Honours with Research: 182 Credits
VIII	12	6*	-	-	-	-	6#	-	18	
3 Years	72	28	9	9	10	6	0	12	146	
%	49.32	19.18	6.16	6.16	6.85	4.11	0.00	8.22	100.00	
4 Years	96	28	9	9	10	6	12	12	182	
%	52.75	15.38	4.95	4.95	5.49	3.30	6.59	6.59	100.00	

**\*Students pursuing Honours will do 3 courses for 8 Credit and 4 Credit minor project in lieu of a Research Project/Dissertation.**

**#Students pursuing Honours with Research would complete 10 Credits of 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	3	0	0	3	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
<b>TOTAL</b>			<b>17</b>	<b>2</b>	<b>6</b>	<b>22</b>	

**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	3	0	0	3	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
<b>TOTAL</b>			<b>17</b>	<b>2</b>	<b>6</b>	<b>26</b>	

**L – Lectures, T- Tutorial, P- Practical**

**On Exit, students shall be awarded UG Certificate (Mathematics) on securing the requisite 48 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 / German / French	3	0	0	3	AEC
7		Presentation Skills	0	0	2	1	SEC (Soft)
8		Statistical Analysis with SPSS	0	0	2	1	SEC (Tech)
<b>TOTAL</b>			<b>18</b>	<b>4</b>	<b>4</b>	<b>24</b>	

**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		Professional Skills	0	0	2	1	SEC (Soft)
6		R Language Programming	0	0	2	1	SEC (Tech)
7		Sports, Yoga & Fitness	0	0	4	2	VAC
8	23SEC471	Live Projects/Vocational Courses/Summer Internship	-	-	-	4	SIP
<b>TOTAL</b>			<b>12</b>	<b>4</b>	<b>8</b>	<b>24</b>	

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

**On Exit, students shall be awarded UG Diploma (Mathematics) on securing the requisite 96 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)
<b>TOTAL</b>			<b>15</b>	<b>4</b>	<b>6</b>	<b>22</b>	

**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
<b>TOTAL</b>			<b>18</b>	<b>5</b>	<b>2</b>	<b>28</b>	

**L – Lectures, T- Tutorial, P- Practical**

**On Exit, students shall be awarded B.Sc. Degree (Mathematics) on securing the requisite 146 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**
<b>TOTAL</b>			<b>11</b>	<b>3</b>	<b>0</b>	<b>18</b>	

**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 #
<b>TOTAL</b>			<b>14</b>	<b>4</b>	<b>0</b>	<b>18</b>	

**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 182 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		23MABS801	Functional Analysis	3	1	0	4

<b>23</b>	<b>VIII</b>	23MABS802	Special Functions	3	1	0	4
<b>24</b>		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**

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

<b>Cat.</b>	<b>Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>Credits</b>
<b>MDC I</b>	23MDC201	Renewable Energy Sources	3	0	0	3
	23MDC202	Electric Vehicle	3	0	0	3
	23MDC301	IPR in Business	3	0	0	3
	23MDC302	Library Information Sciences & Media Literacy	3	0	0	3
	23MDC401	Management Process & Organizational Behaviour	3	0	0	3
<b>MDC II</b>	23MDC203	Introduction to Bio-engineering	3	0	0	3
	23MDC204	Introduction to Robotics	3	0	0	3
	23MDC303	Psychology and Emotional Intelligence	3	0	0	3
	23MDC304	Indian Economy	3	0	0	3
	23MDC402	Creating an Entrepreneurial Mind	3	0	0	3
<b>MDC III</b>	23MDC205	Arduino Based Programming	3	0	0	3
	23MDC305	Electoral Literacy in India	3	0	0	3
	23MDC403	Personal Financial Planning	3	0	0	3
	23MDC404	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	23AEC101	Functional English – I	2	0	0	2
2	23AEC201	Functional English – II	2	0	0	2
3	23HN101 I/ 23FLGR301 I/23FLFR301 I	Hindi / German / French	2	0	0	2
4	23HN101 II / 23FLGR301 II /23FLFR301 II	Hindi / German / French	2	0	0	2

**List of Value-Added Courses (VAC) offered to**

S. No.	Code	Course Name	L	T	P	Credits
1	23VAC102	Indian Constitution & Polity	2	0	0	2
2	23VAC101	Environment Protection & Sustainable Development	2	0	0	2
3	23VAC103	Sports, Yoga & Fitness	0	0	4	2

**Four Year B.Sc. Mathematics programme in the Department of Mathematics  
w.e.f. Academic Year 2023-24**

**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	23SS351	Effective Communication Skills	0	0	2	1
2	23SS452	Teamwork & Interpersonal Skills	0	0	2	1
3	23SS553	Presentation Skills	0	0	2	1
4	23SS654	Professional Skills	0	0	2	1
5	23AR755	Aptitude & Reasoning	0	0	2	1

**Courses on Technical Skills**

S. No.	Code	Course Name	L	T	P	Credits
1	23TS101	Digital Literacy & IT Skills	0	0	2	1
2	23SS202	Advanced Excel Skills	0	0	2	1
3	23SS303	Statistical Analysis with SPSS	0	0	2	1
4	23SS404	R Language Programming	0	0	2	1
5	23SS505	Programming with MATLAB	0	0	2	1