Somaiya School of Basic and Applied Sciences

Faculty of Science

Somaiya Vidyavihar University, Mumbai

Admission Manual

PhD Programme – Mathematics

AY 2025-26 onwards

Visit for Further Details: **https://www.somaiya.edu/en/phd/**

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Somaiya Vidyavihar University, Mumbai

About Somaiya Vidyavihar University, Mumbai

On 26th August 2019, Somaiya Vidyavihar University, Mumbai became a reality !

After six decades of fostering a holistic teaching and learning experience and establishing reputed educational institutions, Somaiya Vidyavihar University, Mumbai, has achieved a significant milestone. It has become the first self-financed private university in Mumbai under the Maharashtra Self-Financed Universities (Establishment and Regulation) Act, 2013.

We aspire to build and support a world-class institution—one that is proudly Indian and excels in education, research, and service. Somaiya Vidyavihar University, Mumbai, will be a hub for preserving, disseminating, and creating knowledge. It will have a global impact through its ideas and a universal commitment to service. Here, students and faculty can embrace the "Freedom of Possibilities," pursue their passions, and, most importantly, discover themselves.

Our History and Vision

An all-round education must integrate Indian culture, values & morality into the curriculum.

Somaiya Vidyavihar was founded on September 9, 1959, by Padmabhushan Shri K.J. Somaiya (1902–1999), a visionary leader with sharp business acumen, a balanced perspective, and a deep commitment to social progress. His dream of shaping young minds through quality education led him to establish the Somaiya Trust in 1953, acquiring a vast expanse of land in Ghatkopar—then a sparsely populated area.

Driven by his passion for education and inclusivity, he later founded the Girivanvasi Pragati Mandal, the K.J. Somaiya Medical Trust, and the Girivanvasi Education Trust, along with several sister institutions, to provide greater access to learning and opportunity. Inspired by Swami Vivekananda's words, *"We want that education by which character is formed, strength of mind is increased, the intellect expanded, and by which one can stand on one's own feet,"* he dedicated his life to fostering knowledge and empowerment.

Over the past six decades, Somaiya Vidyavihar has grown into a thriving educational ecosystem with 34 institutions across diverse fields, including Humanities & Social Sciences, Engineering, Medicine, Management, Education, Dharma Studies, Pure Sciences, and Commerce & Business Studies. Today, with a vibrant 50-acre campus, it is home to over 39,000 students and 3,000 faculty and staff, continuing its legacy of excellence in education and innovation.

With PhD programmes in various faculties, we provide an innovative platform for research aspirants to make a niche of their own to impact society and life.

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About Somaiya School of Basic and Applied Sciences, SVU

The Somaiya School of Basic and Applied Sciences (SSBAS) is a newly established institution under the Faculty of Sciences at Somaiya Vidyavihar University, Mumbai. Initially it is a part of S.K. Somaiya College, SSBAS has grown into a center of academic and research excellence. With six departments, the school offers six undergraduate and eight postgraduate programs, along with a Doctor of Philosophy (Ph.D.) program in six disciplines. SSBAS is equipped with state-of-the-art research laboratories, advanced instrumentation, and cutting-edge software, fostering a seamless integration of science and technology research. The school has successfully secured ₹1 crore+ in research funding from various governmental agencies, reinforcing its commitment to advancing fundamental research for societal development.

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1. **Eligibility criteria for PhD Admission**	
Subject to the conditions stipulated in the SVU PhD Regulations, the following candidate are eligible to seek admission to the PhD Programme	
1. Education Qualification	
i.	Master's degree (2 year or 1 year) or a professional degree declared equivalent to the Master's degree by the corresponding statutory regulatory body, with at least 55% marks in aggregate or its equivalent as per UGC regulations.
ii.	Candidate seeking admission after a 4-year/8-semester bachelor's degree programme (B.Tech / B.E, B.Pharma, MBBS or BDS or BAMS or BHMS or B.Sc (Honors) should have a minimum of 75% marks in aggregate or its equivalent as per UGC regulations
iii.	A person whose Master's dissertation has been evaluated and the viva-voce is pending may be admitted to the PhD Programme but subject to completion of Master's degree before provisional admission to SVU PhD Programmes.
iv.	Candidates possessing a Degree considered equivalent to Master's Degree of an Indian Institution, from a Foreign Educational Institution accredited by an Assessment and Accreditation Agency which is approved, recognized or authorized by an authority, established or incorporated under a law in its home country or any other statutory authority in that country for the purpose of assessing, accrediting or assuring quality and standards of educational institutions, shall be eligible for admission to PhD Programme
2. **PhD Entrance Exam**	
i.	MUST qualify a passing score of PhD Entrance Examination of SVU. This is a mandatory eligibility criteria for all candidates with exemptions mentioned in Point 2.(ii)
ii.	Exemption Criteria from SVU PhD Entrance Examination are: 1. Candidates who qualified in UGC - CSIR -NET-JRF/ ICMR-JRF / DBT-JRF (BET)/ INSPIRE/ GPAT/ICAR/JEST/ Qualified/valid GATE score in relevant branches /Prime Minister's Fellowships and those qualified in any of the UGC recognized national or state level eligibility tests with a valid fellowship/scholarship in the related subject. 2. Candidates with valid GMAT score for last 2 years (1st Jan 2022 to 31st Dec 2024), minimum GMAT score 350 3. Any candidates having 5 year of teaching/research experience and have published research paper in SCOPUS ; Web of science journal/published patents/grant received from government agencies will be exempted from appearing for the SVU PhD entrance exam but will be required to appear for an interview at the respective departments.The exemption criteria will be applicable ONLY when relevant document are uploaded during application submission. If relevant documents are not submitted , the candidate have to appear for Entrance exam.
Note: However, the candidates who fulfill the above criteria MUST fill the application form as per the schedule displayed on the website.	
3. Other Documents	

1. UG Degree or equivalent Mark List 2. UG Degree certificate 3. PG Degree or equivalent Mark List 4. PG Degree or equivalent certificate 5. AADHAR card 6. Degree equivalence / eligibility certificate – wherever is applicable 7. Transfer Certificate and /or Leaving Certificate 8. Migration certificate 9. Two colour passport size Photograph 10. If appearing the PG degree examination – bonafide certificate 11. If employed, then No Objection Certificate (NOC) from the employer – at the time of provisional admission
4. Important Links
UGC Notification 2022 (Link)

2. Categories of Ph D Students
1. Candidates with externally funded scholarships/Fellowships; (a full tuition fee waiver will be provided to candidates who join as JRF/SRF under government of INDIA research funded scheme) 2. Candidates who work in funded projects within the University or in approved research centres which are collaborating with the University; 3. Jointly guided PhD or Co-supervised PhD with International Universities; 4. Teaching/work integrated research candidates who are the faculty/employees in pursuit of advancing their academic qualification, recommended by the Head of the Institution and the Academic Advisory Committee. This provision is for those candidates who shall take an undertaking that their routine responsibilities would be duly attended and under no circumstances compromised. The university shall reserve the rights to consider the registration of candidates who do not adhere to these guidelines; 5. Teaching and Research Associates of the Somaiya Vidyavihar University. 6. "Somaiya Vidyavihar University Research fellow under Chancellor's Scholarships Programme". 7. "Any candidates having 5 year of teaching/research experience and have publish research paper in SCOPUS; Web of science journal/published patents/grant received from government agencies will be excepted from appearing for the SVU PhD entrance exam but will be required to appear for an interview at the respective departments" 8. Candidate is permitted to pursue studies on a part-time basis provided all the conditions stipulated in UGC 2022 regulations are fulfilled.

3. Overview of Steps involved in PhD Programme	
Sr.No.	Steps
PhD Pre-selection Phase	
1.	Advertisement / Call for SVU PhD entrance exam on website /media handles
2.	Acceptance of the applications for PhD entrance examination along with the applications processing fee

3.	Execution of PhD entrance examination for all PhD programmes
4.	Declaration of PhD entrance examination results
5.	Selection process - Display of list of eligible shortlisted candidates for interview
6.	One- on -one Interviews of shortlisted candidates before an expert panel
7.	Display of selected candidates for provisional admission - Selection process complete
Provisional Admission Phase	
8.	Provisional admission and payment of fees in accounts/admin office of the constituent unit of Somaiya Vidyavihar University, Mumbai.
9.	Orientation and initiation of course work (1 year – 2 semesters)
10.	First semester encompasses research methodology & publication ethics along with subject specific topic. Second semester majorly focus on building research , technical & soft skills. It includes research activities, lab rotation and research proposal drafting & presentation and its evaluation.
11.	ATKT examination for the semester I and II for unsuccessful candidates or for grade improvement
12.	Issue of mark sheets for course work of semester I and II
Allotments & Registrations	
13.	Allotment of the guide at individual constituent unit-level /department (within the first six months of provisional admission)
14.	Topic approval of the thesis work within 2-3 months after Qualifying course work examination
15.	Registration for PhD programme
PhD Phase	
16.	Appointment of Examiners and chairman from Research Committee
17.	Annual Progress Seminars (APS) and Intermediate Progress Seminar (IPS) for the academic year by Doctoral Advisory Committee (DAC)
Submission & defence	
18.	Approval of examiners to present pre-synopsis in one of the APS and IPS
19.	Presentation of pre-synopsis and its approval by the examiners
20.	Submission of thesis to COE office
21.	Sending the thesis to reviewers
22.	Receipt of reviews about thesis from the reviewers
23.	The final defense of the thesis
24.	Submission of the final corrected thesis after defense
25.	Issue of provisional PhD certificate
26.	Issue of PhD certificate
	The steps and the progress evaluation of PhD students by the committee/examiners/experts will be as per the provisions of PhD regulations

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4. Pattern and syllabus of SVU PhD Entrance Examination
Paper-1 Qualitative Test – 40 marks a) Essay Writing – 20 marks b) Comprehension – 20 marks (50% choice in selecting questions in paper I)
Paper – 2 Subject Specific Test – 60 marks a) Multiple Choice Questions – 20 marks (Attempt 20 out of 30 questions) b) Subject Specific Questions – 40 marks (with 50% Choice)

5. About Course Work
The course work will be of one academic year (two semesters) and out of which the first semester will be full time. It is expected that during the first semester, the student will report the School/Department/Section/Laboratory for attending the sessions as per Timetable. The student will have to complete a total of 14 credits (semester I) + 5 credits (semester II) = total 19 credits with CGPI as per the PhD regulations to become eligible for the registration to PhD programme.

6. Fee Structure of PhD Program

(This is common across disciplines, all categories of students)

Particulars	@Total Fees per annum (₹)	
	First Year	Second Year Onwards
Tuition Fee	30,000/-	30,000/-
Development Fee	10,000/-	10,000/-
Examination Fee	10,000/-	10,000/-
Caution money Deposit (Refundable)	1,000/-	-----
Library Deposit (Refundable)	2,000/-	-----
Total (₹)	53,000/-	50,000/-
@ If paid provisional admission fee then should be deducted from total fee		
Link for fees payment (Fees will be accepted via online payment gateway only and in no case, it can be paid using any other type of mode of payment and to any office/person)	https://myaccount.somaiya.edu/#/login	

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7. Registration, Synopsis & Ph D Thesis Submission Fees	
Particulars	Amount
Registration fees	5000
Approval of Synopsis of PhD Thesis Topic	5000
PhD Thesis Submission	10000
Total	20,000/-

Note:

1. Registration fees to be paid by the PhD scholars before submitting the application for Registration for Ph D.
2. Synopsis PhD Thesis Submission fees to be paid by the PhD scholars before submission of synopsis.

8. Payment of fees schedule for Provisional admission and subsequent years of PhD programme

Program Academic Year	Particulars	Amount in Rupees (₹)	Payment Schedule
First Year	Total fee	53,000/-	Within eight days from the date of receiving the offer letter
Second Year and Onwards	Total fee	50,000/-	Within first week from the commencement of the new Academic Year
Link for fees payment (Fees will be accepted via online payment only and in no case it can be paid using any other mode of payment and to any office/person)		https://myaccount.somaiya.edu/#/login	
Note: Students have to pay the full fees of the program per year till the submission of the thesis			

9. Guidelines to make fee payment in Online Mode

There is a provision of ONLINE PAYMENT of school fees for student's' convenience 24x7 on or before the scheduled due date. Student will get notification from the institute in three ways.

1) SMS
2) Email
3) Notification on myaccount.somaiya.edu portal

In the notification there will be a link to make the payment. You just need to click on the link and follow below simple steps to make the payment.

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STEP 1: Link will take you to myaccount.somaiya.edu portal. Use Somaiya SVV Net ID and password to login. Want to know more about myaccount.somaiya.edu click on https://somaiya.edu/media/pdf/SVVNetID_and_EmaiI%20id.pdf

STEP 2: Login, select 'instalments' and click on "Pay Now".

STEP 3: System will redirect to Online Payment Gateway. Fill in the required information and follow payment options to complete the payment cycle.

STEP 4: After the successful payment, the payment receipt will be available at student's MyAccount portal

10. Admission Cancellation policy of PhD programme

(All Categories of PhD Students)

If the candidate has accepted the allotted seat by paying the fees and later chooses/decides to withdraw from the programme of study, then cancellation option is available at his/her MyAccount login.

The School shall follow the below system for deduction of fees against the cancellation request for the candidate.

Sr. No.	Point of time when the application for admission cancellation is received by the school	Applicable Deduction
1	15 days or more before the date of commencement of academic term	Rs 5,000/-
2	Less than 15 days before the date of commencement of the academic term	10% of total fees
3	Less than 15 days from the date of commencement of the academic term	20% of total fees
4	On or beyond the 15th day but within six weeks from the date of commencement of the academic term	50% of total fees
5	More than six weeks from the date of commencement of the academic term	100% of total fees

Note:

- Total Fees for the program per year is Rs. 50,000/- for All Categories of PhD Students
- Tentative date of commencement of every academic term will be announced on website.

Typical Sample example for further illustration to know about cancellation charges with reference to the date of commencement of term

Refer the below example for clarification of PhD admission cancellation policy

Assume that the academic term commences from 15th July of a particular academic year. Based on this assumption, following table illustrates important dates of cancellation policy:

Illustration:

Sr. No.	**Point of time when an application for admission cancellation is received by school**	**Applicable Deduction**

1	Cancellation on or before 30th June (up to 11.59pm)	Rs 5,000/-
2	Any time from 1st July to 14th July (up to 11.59pm)	10% of total fees
3	Any time from 15th July to 28th July (up to 11.59pm)	20% of total fees
4	Any time from 29th July to 25th August (up to 11.59pm)	50% of total fees
5	After 25th August	100% of total fees

11. Process of getting documents submitted return
After verifications of documents, within 7 days, documents will be returned to students.

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Mathematics

About Research Center

Mathematics is a broad discipline in which calculus, algebra, analysis, number theory etc. are studied to derive new functions, properties and results. These results are used in different fields of science, technologies, economics etc. The research centre in Mathematics has been established in the Department of Mathematics and Statistics, S K Somaiya College, Somaiya Vidyavihar University. The primary focus of the PhD centre for Mathematics is to provide world class education, training and conduct innovative research at the interface of multiple disciplines to create high quality human resource in disciplinary and interdisciplinary areas of Mathematics in a globally competitive research milieu. Both basic and applied research topics will be addressed in this research centre. The PhD Research programme has started from the academic year 2022-23. Faculty members also collaborate with experts from National Institutes of India and abroad. Their research component further strengthens & enriches the teaching programme. Faculty members of the research centre have an excellent track record of research in various areas of Mathematics. The Faculty members have excellent records of publication in journals with high impact factors like Springer, Elsevier etc. Faculty members have presented several papers in reputed national and international peer reviewed conferences. Faculty member also possesses number of recognized awards from renowned organizations of the globe.

KEY FEATURES

- Department with PhD-qualified faculty
- Dynamic curriculum
- Aim for Research-driven opportunities in Institutions in India and abroad
- Wide range of program and open electives
- Opportunity for students to carry out inter-disciplinary research projects
- Workshops and Guest Lectures on a regular basis

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Eligibility at UG/PG Degree	
Branch of study at UG	Mathematics Statistics
Branch of study at PG	Mathematics Statistics.

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Syllabus for Entrance Examination in Mathematics

Unit-I: Analysis

Elementary set theory, finite, countable and uncountable sets, Real number system as a complete ordered field, Archimedean property, supremum, infimum. limsup, liminf. Bolzano Weierstrass theorem, Heine Borel theorem, Limits , Continuity, uniform continuity, differentiability, mean value theorem, Sequences and series of functions, convergence, uniform convergence, Weierstrass approximation theorem, Riemann sums and Riemann integral, Improper Integrals, Monotonic functions, types of discontinuity, functions of bounded variation, contraction mapping principle, Inverse and Implicit function theorems, Lebesgue measure, measurable functions Lebesgue integral, Functions of several variables, directional derivative, partial derivative, total Derivative, maxima and minima, saddle point, method of Lagrange's multipliers; derivative as a linear transformation, Metric spaces, compactness, connectedness, Normed Linear Spaces, Spaces of Continuous functions, Fatou's lemma, monotone convergence theorem, dominated convergence theorem, Double and Triple integrals and their applications; Line integrals and Surface integrals, Green's theorem, Stokes' theorem, and Gauss divergence theorem.

Unit-II: Complex Analysis:

Algebra of complex numbers, Analytic functions, Harmonic Functions, Cauchy-Riemann equations, Contour integral, line integrals, Cauchy's Theorem and integral formula, Morera's theorem, Liouville's theorem, Maximum modulus principle, Schwarz lemma, Open mapping theorem, Power series, Taylor's and Laurent's series, Classification of zeros & singularities, Radius of Convergence, Residues, Contour integration, Riemann Sphere and Stereographic projection, Conformal mapping, Mobius transformations.

Unit-III: Linear Algebra:

Vector spaces, subspaces, linear dependence, basis, dimension, algebra of linear transformations & their matrix representations, Algebra of matrices, rank and determinant of matrices, rank & nullity, systems of linear equations, Eigenvalues and eigenvectors, Cayley-Hamilton theorem, minimal polynomial, diagonalization, Jordan canonical form, symmetric, skew-symmetric, Hermitian, skew-Hermitian, orthogonal and unitary matrices; Change of basis, canonical forms, diagonal forms, triangular forms, Jordan forms, Finite dimensional inner product spaces, Gram-Schmidt orthonormalization process, definite forms, Inner product spaces, orthonormal basis, Quadratic forms, reduction and classification of quadratic forms.

Unit-IV: Algebra:

Permutations, combinations, pigeon-hole principle, inclusion-exclusion principle, derangements, Fundamental theorem of arithmetic, divisibility in Z, congruence, Chinese Remainder Theorem, Euler's Ø- function, primitive roots, Groups, subgroups, normal subgroups, quotient groups, homomorphisms, automorphisms, cyclic groups, permutation groups, Cayley's theorem, class equations, Sylow theorems and their applications, Rings, ideals, prime and maximal ideals, quotient rings, unique factorization domain, principal ideal domain, Euclidean domain, Polynomial rings and irreducibility criteria, Fields, finite fields, field extensions.

Unit-V:Ordinary Differential Equations (ODEs):

First order ordinary differential equations, existence and uniqueness theorems for initial value problems, singular solutions of first order ODEs, system of first order ODEs, linear ordinary differential equations of higher order with constant coefficients; Second order linear ordinary differential equations with variable coefficients; Cauchy-Euler equation, method of Laplace transforms for solving ordinary differential equations, series solutions (power series, Frobenius method); Legendre and Bessel functions and their orthogonal properties; Systems of linear first order ordinary differential equations, General theory of homogenous and nonhomogeneous linear ODEs, variation of parameters, Sturm-Liouville boundary value problem, Green's

function.

Unit-VI:Partial Differential Equations (PDEs):

Linear and quasi-linear first order partial differential equations, Lagrange and Charpit methods for solving first order PDEs, method of characteristics; Second order linear equations in two variables and their classification; General solution of higher order PDEs with constant coefficients, Cauchy, Dirichlet and Neumann problems; Solutions of Laplace and wave equations in two dimensional Cartesian coordinates, interior and exterior Dirichlet problems in polar coordinates; Separation of variables method for Laplace, heat & wave and diffusion equations; Fourier series and Fourier transform and Laplace transform methods of solutions for the equations mentioned above.

Unit-VII:Numerical Analysis:

Numerical solutions of algebraic equations and transcendental equations: bisection, secant method, Newton-Raphson method, fixed point iteration, Method of iteration, Rate of convergence, Numerical solution of a system of linear equations: direct methods (Gauss elimination, LU decomposition), iterative methods (Jacobi and Gauss-Seidel); Numerical solution of initial value problems of ODEs: Euler's method, Runge-Kutta methods of order 2, Numerical solutions of ODEs using Picard, Euler, modified Euler and Runge-Kutta methods, Finite differences, Interpolation: error of polynomial interpolation, Lagrange, Newton, Hermite and spline interpolation, Numerical differentiation and Numerical integration: Trapezoidal and Simpson's rules.

Unit-VIII:Linear Programming:

Linear programming problem and its formulation, convex sets and their properties, graphical method, basic feasible solution, simplex method, two phase methods; infeasible and unbounded LPP's, alternate optima; Dual problem and duality theorems; Balanced and unbalanced transportation problems, Vogel's approximation method for solving transportation problems; Hungarian method for solving assignment problems.

Unit-IX:Integral Transform:

Laplace transform; Transform of elementary functions, Transform of Derivatives, Inverse Transform, Convolution Theorem, Applications, Ordinary and Partial

differential equations; Fourier transform; sine and cosine transform, Inverse Fourier Transform, Application to ordinary and partial differential equations.

Unit-X: Discrete Mathematics:

Partially ordered sets, Lattices, Complete Lattices, Distributive lattices, Complements, Boolean Algebra, Boolean Expressions, Application to switching circuits, Elements of Graph Theory, Eulerian and Hamiltonian graphs, planar Graphs, Directed Graphs, Trees, Permutations and Combinations, Pigeonhole principle, principle of Inclusion and Exclusion, Derangements.

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Details of PhD Coordinator

Details of PhD Coordinator

School Code	School / Institute Name	Name of PhD	Email ID
44	Somaiya School of Basic and Applied Sciences	Dr. Nilesh Wagh	nilesh.wagh@somaiya.edu
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