



**SRM**  
UNIVERSITY AP  

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**Andhra Pradesh**

**B.Sc (Hons) in Mathematics (Four Year  
Programme)**

**Academic Year: 2021-2025**

## **Main Features**

- Name of the program: B.Sc. in Mathematics (Honours).
- Our 4-year undergraduate degree program is based on the NEP 2020.
- Total credits: 180.
- Semester-wise credit distribution: Up to Fifth Sem:  $5 \times 24 = 120$ .
- Sixth Sem:  $4 \times 5 = 20$ . Seventh Sem:  $4 \times 5 = 20$ , and Eighth Sem:  $4 + 16 = 20$ .
- Up to 5th-semester common courses for all math students.
- Final semester (8th semester): is for undergraduate research project work. Total credits for project work: 75% for project report + 25% presentation. Including two summer projects (Credit for summer projects:  $2+2=4$ ), the total credits for UG research project work are  $4+16=20$ .
- Until the 5th semester, the main aim is to provide a strong foundation in mathematics.
- For 6th and 7th semesters: These two semesters are for specializations: 1. Pure Mathematics 2. Applied Mathematics 3. Data Science and Industrial Mathematics
- Non-Credit Courses: These courses are on Mathematica, Matlab, Latex, etc., to prepare students for getting a job/Ph.D.

## **Objectives of the Curriculum**

- The curriculum is designed so that it will provide a solid foundation in mathematics, give a flavor of some very advanced modern branches of mathematics, and develop interdisciplinary skills.
- SRM University-AP is the first Indian university to introduce a four-year B.Sc. in Mathematics curriculum. This curriculum aims to provide one of the best undergraduate programs in Mathematics in India.
- After completing the B.Sc program, our students can directly take admission for the Ph.D. program in India and abroad.
- Data Science and Industrial Mathematics students will be very well-trained for the industry.
- Due to a broad spectrum of electives (including four advanced discipline-specific electives) and the undergraduate research project work, students will be well-prepared for the Ph.D. program.
- SRM University-AP faculties will take special care to supervise each undergraduate research project. An excellent undergraduate research project

will solidify students' mathematical skills and get good admission to top-quality graduate schools in the US and Europe.

- The curriculum is designed to make students confident of appearing for national and international level maths competitive exams (e.g., GRE, CSIR NET, NBHM, GATE, JAM, TIFR, ISI, CMI, etc.) as well as to work in the industry like IT and Finance.

## **Why Study at SRM University-AP?**

- **Unique Curriculum:** It is a 4-year B.Sc. in Mathematics (Hons) degree program. Until the 5th semester, it has strong foundational maths courses, including Minor and Allied courses. From the 6th Sem, specialization starts. And there are three disciplines:
  - Pure Mathematics
  - Applied Mathematics
  - Data Science and Industrial Mathematics
- We have very good contacts with other institutes of eminence both in India and abroad.
- Apart from a broad spectrum of advanced elective courses, students will be offered minor stream courses such as Physics, Computer science, Chemistry, Economics, Statistics.
- **Campus-Placement:** SRM University-AP has an unmatched record in placing undergraduate students. SRM University-AP organizes an extensive series of industry and research-specific seminars, workshops. It also has many training programs designed to professionalize students in their fields. Department of Mathematics has a representative in the Campus-Placement Cell.
- **University Scholarships:** Based on merits, at SRM University-AP, three types of scholarships are offered:
  - **Full Scholarship:** Complete waiver of tuition, accommodation, and mess fees.
  - **Partial Scholarship:** Tuition fee full/Partial waiver
  - **Other Scholarship:** Also, SRM University-AP awards scholarships to economically challenged and differently-abled students.
- **Faculty:** All the faculty members have Ph.D. degrees from leading institutions like IITs, IISc, CMI, and reputed foreign universities. Most of the faculty have international experience in research and teaching.
- **Infrastructure:** Including an excellent library with online and offline resources, dining area, hostels, grocery store, health center and pharmacy, bank with

ATM, post office, and other amenities to make learning easier. The University has a world-class campus which Perkins+Will, the American architecture firm that specializes in educational institutions.

- International Collaborations: SRM University-AP has collaborations with many eminent institutions, including Harvard Business School, USA, University of Wisconsin, Madison, Illinois Institute of Technology, Northeastern University, Asia University, Taiwan, Flinders University, Australia, and National Tsing Hua University, etc.
- Our students gain global exposure through the unique opportunity of spending a semester (or an academic visit) abroad.
- The collaborations foster knowledge creation, skill enhancement, and advancement of an industry association.
- Industry-Internship for our Data Science and Industrial Mathematics: We will assist students in getting at least two summer internships programs in the industry. It will help to get industry exposure, and the internship reports will also add four credits to the curriculum. It will also provide additional insight to the business operatives.
- SRM University-AP has a very efficient University-Placement Cell. Therefore, for all interested students, irrespective of their specializations, we will have campusing opportunities. Our students will have an excellent training facility for the industry jobs.

## **Details Course Structure**

### **First Semester (Total credit: $6 \times 4 = 24$ )**

- Real Analysis - 1
- Linear Algebra
- FC - 1: Foundation of Mathematics
- FC - 2: Communicative English
- Minor - 1
- Minor - 2

### **Second Semester (Total credit: $6 \times 4 = 24$ )**

- FC - 3: Environmental Science
- FC - 4
- Minor - 3
- Minor - 4
- Algebra - 1

- Real Analysis - 2 (Multi-variable)

**Third Semester (Total credit:  $6 \times 4 = 24$ )**

- FC - 5
- FC - 6
- Minor - 5
- Minor - 6
- Geometry/ Curves and surfaces (2D & 3D)
- Algebra - 2 (Rings and Modules)

**Fourth Semester (Total Credit:  $6 \times 4 = 24$ )**

- Minor - 7
- Minor - 8
- Complex Analysis
- Probability and Statistics
- Ordinary Differential Equation - 1
- LPP/Optimization Techniques

**Fifth Semester (Total credit:  $6 \times 4 = 24$ )**

- Metric Space and Topology
- Elementary Number Theory
- Real Analysis - 3
- Programming Language Concepts
- Partial Differential Equations - 1
- Numerical Analysis

**Sixth Semester for Pure Mathematics (Total Credit:  $5 \times 4 = 20$ )**

- Algebra - 3
- Measure Theory
- Functional Analysis
- Discipline Specific Elective - 1
- Discipline Specific Elective - 2

**Seventh Semester for Pure Mathematics (Total Credit:  $5 \times 4 = 20$ )**

- Algebraic Topology
- Differential Geometry
- Operator Theory
- Discipline Specific Elective - 3
- Discipline Specific Elective - 4

**Eighth Semester for Pure Mathematics (Total Credit:  $4 + 16 = 20$ )**

- Undergraduate research project work

**Electives for Pure Mathematics**

- Analytic Number Theory

- Algebraic Number Theory
- Local Fields
- Class Field Theory
- Arithmetic Geometry
- p-adic Analysis
- Harmonic Analysis
- Representation Theory
- Differential Topology
- Discrete Dynamical System
- Graph Theory and Combinatorics
- Advanced Linear Algebra
- Fourier Analysis
- Algebraic Group
- K-Theory
- Mathematics Behind Fuzzy Logic
- Fuzzy Mathematics
- Commutative Algebra
- Basic course on Algebraic Geometry
- Advanced topics in complex analysis
- A course on Riemann surface

**Sixth Semester for Applied Mathematics(Total Credit:  $5 \times 4 = 20$ )**

- Functional Analysis
- Measure Theory
- Mechanics and Tensor Calculus
- Discipline Specific Elective – 1
- Discipline Specific Elective - 2

**Seventh Semester for Applied Mathematics(Total Credit:  $5 \times 4 = 20$ )**

- ODE - 2
- PDE - 2
- Fluid Dynamics
- Discipline Specific Elective – 3
- Discipline Specific Elective - 4

**Eighth Semester: Applied Mathematics(Total credit:  $4+16=20$ )**

- Undergraduate research project work

**Electives for Applied Mathematics**

- Applied Linear Algebra
- Mathematical and Computational Biology
- Mathematical Economics
- Computational Fluid Dynamics
- Industrial Mathematics
- Transform Techniques

- Optimization Techniques
- Nonlinear Optimization
- Inverse problems and regularizations
- Calculus of Variations
- Integral equations and Boundary Value problems
- An Introduction to Numerical Methods using MATLAB
- Advanced Numerical Techniques
- Elementary Distribution Theory
- Mathematical Modelling and Simulation
- Chaos and Fractals

**Sixth Semester for Data Science and Industrial Mathematics(Total credit: 5 × 4 = 20)**

- Data Structures and Algorithms
- Object-oriented Programming
- Applied Statistics/Probability – 2
- Discipline Specific Elective – 1
- Discipline Specific Elective - 2

**Seventh Semester for Data Science and Industrial Mathematics(Total credit: 5 × 4 = 20)**

- Financial Mathematics
- Nonlinear regression analysis
- Stochastic process and Stochastic Differential Equations
- Discipline Specific Elective - 3
- Discipline Specific Elective - 4

**Sixth Semester for Data Science and Industrial Mathematics(Total credit: 5 × 4 = 20)**

- Undergraduate research project work

**Electives for Data Science and Industrial Mathematics**

- Mathematical Economics
- Financial Mathematics-2
- Mathematics for Artificial Intelligence
- Industrial Mathematics
- Stochastic Methods in Industry
- Theory Of Computation
- Graph Theory
- Applied Stochastic Processes
- Applied Regression Analysis
- Mathematical Statistics

- Applied Linear Algebra
- Introduction to Machine Learning
- Algorithms and Optimization for Big Data
- Compiler Design
- Automata Theory
- Basic Networking Concepts

**Electives/Minor courses for maths education**

- A first course in Mathematics Education
- Approaches in Teacher professional development in Mathematics Education
- Approaches to Curriculum development in Mathematics Education Advanced course in Mathematics Education
- Equity and social justice in Mathematics Education
- Issues and challenges in assessment in Mathematics Education