MSc & PhD Programmes

PROSPECTUS

2025-2026

Department of Computer Science

Ramakrishna Mission Vivekananda

Educational & Research Institute

Education is the manifestation of perfection already in man.

Vivekananda

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Part One

1. Overview

1.1 The Institution

Ramakrishna Mission Vivekananda Educational and Research Institute (RKMVERI) is a recognized Deemed-to-be-University, overseen by the Ramakrishna Mission – a charitable, philanthropic, and spiritual organization with over more than 200 branches worldwide.

Government of India declared RKMVERI, through a Gazetted Notification dated 5 January 2005, as a *de novo* Deemed-to-be-University under Section 3 of UGC Act, 1956. The institute has four campuses situated at key locations: the main campus in Belur (Howrah District, West Bengal), Coimbatore (Tamil Nadu), Ranchi (Jharkand), and Narendrapur (Kolkata, West

Bengal). The Deemed-to-be-University status was confirmed by a Notification from the Ministry of Human Resource Development (MHRD) in 2012.

The School of Mathematical Sciences located at the Belur campus, comprising the Departments of Mathematics, Physics and Computer Science has been functional since July 2008.

1.2 Areas of Academics

This University offers various programmes in the following areas:

Mathematical Sciences
Sports Science And Yoga
Agricultural Biotechnology
Plant Breeding And Genetics
Rural & Tribal Development
Disability Management & Special Education
General & Adapted Physical Education
Indian Cultural & Spiritual Heritage
Sanskrit
Music

1.3 Notable Laurels

It is a matter of pride that RKMVERI is the pioneer in the country in offering courses in Disability Management & Special Education at our Coimbatore campus. RKMVERI has put forth significant academic venture in this gap area offering undergraduate,

postgraduate, and doctoral programs.

In March 2019, the university received accreditation from NAAC (National Academic Accreditation Council) with the highest grade of **A++**, achieving a total CGPA of 3.66 out of 4.

1.4 Programmes offered by the Department

Computer Science, Data Science and Artificial Intelligence play a pivotal role in this era of AI revolution. Their presence in today's world is ubiquitous. There is a great demand, both in industry and in academia, for individuals who possess a solid understanding of the underlying concepts and principles governing computer science and data science, coupled with the ability to apply these principles to solve real-world challenges.

The Department of Computer Science at RKMVERI is dedicated to equipping students with the skills necessary to meet these demands, which will enable them to excel in their professional careers - be it in academia, research or industry.

Any graduate holding a bachelor degree in any field from any university is supposed to have a broad knowledge of that field. A master degree holder on the other hand should have a deeper understanding of the field. A doctorate in contrast indicates that one has contributed to a field of knowledge in some original way.

The programmes thus aim to prepare postgraduate students for both research and the software industry. Upon completion, students are expected to have sufficient breadth of knowledge to be absorbed in any applied software industries or if they choose the path of academic career,to have the potential for conducting research in the areas they have accquired specialization.

The Department of Computer Science at RKMVERI offers two full-time post-graduate degree programmess: MSc in Com-

puter Science (CS) (specialisation in AI or Theoritical Computer Science) and MSc in Data Science and Artificial Intelligence (earlier known as Big Data Analytics) with the following programme outcomes in perspective.

- Foster critical thinking skills for conducting scientific investigations objectively, free from preconceived biases.
- Equip the student with skills to analyze problems, formulate hypotheses, evaluate and validate results, and draw reasonable conclusions thereof.
- Prepare students for pursuing careers in research, industry, or academia focusing on mathematical sciences and allied fields
- Cultivate effective scientific and technical communication skills, both orally and in writing.
- Encourage ongoing acquisition of relevant knowledge and skills necessary for professional activities, while upholding the highest ethical standards in mathematical sciences.
- Promote awareness towards becoming an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

1.5 Conections with reputed institutions

With prior approval from the Dean of Academic Affairs at ISI Kolkata, our students have the opportunity to enroll in certain courses alongside ISI's master's students. This arrangement provides our students with enhanced exposure and the chance to engage with a broader community of scholarly peers. Additionally, we frequently host professors from ISI Kolkata to deliver lectures to our students.

The students are tutored additionally by distinguished professors hailing from universities abroad and prestigious national

institutes, including IITs. These professors teaches specialized courses on statistics, computer science and data analytics.

Moreover, we have established a Memorandum of Understanding (MoU) with the Variable Energy Cyclotron Center (VECC), Kolkata, a unit of the Department of Atomic Energy, Government of India. This collaboration focuses on research and development in the field of Indian Sign Language recognition and generation. The recognition problem involves identifying gestures and signs of the signers and translate them into natural language/text using state-of-the-art deep learning techniques, while the generation problem is to translate text into sign languge with the help of an avatar (animation).

The department regularly invites distinguished researchers and industry leaders to deliver talks on cutting-edge topics. Recently, the world-renowned mathematician and computer scientist Dr. Pavol Hell, Professor of Computing Science at Simon Fraser University, Burnaby, Canada, led a seminar at RKMVERI on "A Graph Theory Perspective on the Quest for Dichotomy."

We also hosted a webinar by Mr. Rajdeep Mazumder, American Head of Delta One and Equity Derivatives Trading at HSBC, titled "Breaking into Capital Markets – A Technology-First Approach."

In addition, Dr. Swapna Agarwal, Senior Scientist at Adani AI Labs, Kolkata, conducted a seminar highlighting the industrial applications of Computer Vision.

1.6 The Computer Science and Data Science Synergy

The Computer Science and Data Science curricula are designed to allow CS students the flexibility to enroll in advanced courses alongside DS students. As a result, CS students are well-prepared

Seminar on 'A graph theory perspective on the quest for Dichotomy' by Dr. Pavol Hell, Professor of Computing Science at Simon Fraser University, Burnaby, Canada on 5 February 2025

to pursue careers as Data Analysts. Likewise, while DS students focus on becoming data scientists, they have the option to enhance their programming skills or delve into theoretical aspects of computer science by opting courses from the CS curriculum.

The fourth semester is dedicated to completing a Master's Project which carries 8 credit. Students have the freedom to undertake either an academic or an industrial project, depending on their interests and available opportunities. The presentation of the project work is evaluated by subject experts invited from other premium institutions.

1.7 Salient Features of the Department

- **Curriculum**: The curriculum is designed with input from industry experts and reflects current industry trends. Examples of advanced courses include Large Language Models, Blockchain, Bayesian Machine Learning, Reinforcement Learning, Computational Geometry, Computational Topology, and Complexity Theory.
- **Interdisciplinary Courses**: Students can explore interdisciplinary courses such as Quantum Computing, Econometrics, and Finance.

- **Faculty Members**: All faculty members are highly qualified and dedicated. Details can be found on our website.
- **Research Collaboration**: The department fosters research collaborations with esteemed institutions such as VECC Kolkata, ISI, IITs, TCG-CREST, and the University of Liverpool.
- **Research Lab**: Our labs are equipped with state-of-the-art facilities, including Deep Learning computing facility with Nvidia's A100 GPU.
- **Grants and Funding**:
  We received a DST-SHRI grant approval for "3D scanning of historical artifacts and heritage buildings associated with Swami Vivekananda and disseminating his message through 3D Virtual Reality" in 2023
  In 2022, we received a DST-FIST grant approval (worth over 1 crore) to set up a new AI Lab on server for big data analytics sanctioned.
- **Tuition Fees**: Tuition fees are deliberately kept low to ensure accessibility for students from economically disadvantaged strata of the society (Rs. 25,000 per semester).
- **High Speed Internet**: We are a member of the National Knowledge Network, providing high-speed internet access at 1 Gbps.
- **Library**: The central library offers paperless book checkouts and features internet kiosks.
- **Multimedia Facilities**: Facilities include audio-visual rooms for online classes, video conferences, and seminars.
- **Mentorship Program**: A structured mentorship program fosters relationships between teachers and students to address personal greviances of the students.
- **Learning Manangement System**: Students and teachers

actively utilize the learning management system to make the learning effective and more accessible.

- **Hostel Accomodation**: On-Campus hostel accommodation with 24 x 7 Wifi access available










Images from Perceptron 2025 – An inter-university techfest organised by the Department of Computer Science in January, 2025

2. Offered Programmes

The Department of Computer Science offers three programmes:

Programmes	Intake Capacity
1. MSc in Data Science and AI	35
2. MSc in Computer Science	20
3. PhD in Computer Science	4

The details of each of these programmes are given below:

2.1 MSc in Data Science and Artificial Intelligence

The MSc in Data Science and Artificial Intelligence is a 4-semester PG degree program. As of now, there about 10 institutions offering this program across India, with only one such institution in West Bengal. In the first three semesters the students are taught

the core concepts, techniques and tools required for analyzing large-scale data.

One of the unique features of the Data Science and Artificial Intelligence programme's curriculum is its rich blend of various disciplines and technologies including mathematics, computer science, statistics, and state-of-the-art big data technologies such as, NoSQL, Hadoop, Spark, etc. Thus, our students automatically gain interdisiciplinary knowledge and skills which are essential in today's competitve landscape. Laboratory sessions and tutorials put these concepts to practice through the execution of real-life use cases obtained from various domains.

Objective Statement of MSc in Data Science and Artificial Intelligence

The Data Science and Artificial Intelligence degree program is designed to inculcate in student the following.

- Foundational understanding of statistical methods, probability, mathematical principles, and relevant computing techniques for data analytics.
- Proficiency in storing, organizing, and manipulating structured data.
- Insight into the complexities involved in big data computing.
- Familiarity with contemporary big data technologies
- Understanding about the analytics process beginning with problem identification and translation, followed by model building and validation with the aim of knowledge discovery in the given domain.
- Ability to estimate various statistics from stored and/or streaming data in the iterative process of model selection and model building.
- Capability to predict Future events with a degree of uncer-

tainty.

- Application of odelling optimization techniques such as linear programming, non-linear programming, transportation techniques in various problem domains such as marketing and supply chain management.
- Competence in interpreting analytical models to facilitate informed business decisions.

This two-year degree programme comprises 80 credits, with each credit representing 16 teaching hours.

The fourth semester is dedicated for the 8-credit Master's degree Project. Students have the option to pursue either an academic or an industrial project based on their interests. Upon completion of the project, students are required to present their findings before aa panel of esteemed faculty members, and also submit a dissertation detailing their work.

Transferable Skills

Through coursework, students acquire essential skills and proficiency in various areas:

R (Statistical Programming Language)
Python for Machine Learning (Programming language)
Linux (operating system)
Scikit-Learn, Pytorch, TensorFlow (Machine Learning Tools)
Hadoop (Big Data technology)
Report preparation and presentation in Latex
Data Visualazation using ggplot2, matplotlib, seaborn
SQL, and No-SQL
Communicative English.

2.2 MSc in Computer Science

The MSc in Computer Science is a 4-semester PG degree programe. The programme offers options for specialisation either in Artificial Intelligence or Theoritical Computer Science. Students can opt for courses from these areas after the completion of the 1^{st} semester. It's common for students to pursue PhDs at reputed institutes after the programme completion.

The curriculum for this degree programme has a rich blend of theory and practicals which is essential for careers in research and development.

Objective Statement of MSc in CS

The MSc CS degree program is designed to inculcate in student the following.

- Understanding of the theoretical underpinnings in computing and computing systems.
- Knowledge of the interfacing of softwares with hardwares through the study of computer architecture, compilers, and systems programming.
- Knowledge about storage, organization, and manipulation of structured data.
- Knowledge and application of various algorithms, algorithmic methods, and data structures in solving computational problems drawn from various fields such as computational geometry, distributed systems, data mining, mobile computing, computer vision, artificial intelligence etc.
- Understanding of the linkages that optimization techinues has with machine learning, deep learning, data mining, computer vision etc
- Knowledge of complexity classes and its appearance in al-

gorithm design.
- Develop workable solutions for problems drawn either from social context or from research corpus.
- Develop applications for handheld devices in Android.
- Use software development tools, software systems in modern computing platforms.
- Communicate computer science concepts, designs, and solutions effectively and professionally.

Relevant skills obtained through the courses: The students are well versed with

C, C++, Java, R, Python (programming languages)
Linux (operating system)
Scikit-Learn,Pytorch, TensorFlow (machine learning tool)
Hadoop, (big data technology)
Preparation of reports and presentations in Latex
Communicative English

MSc Programme Requirements

A student is supposed to complete the following requirements: courses (includes both core-courses and electives), term project, and MSc Degree project.

- MSc in **Computer Science** and **Data Science and Artificial Intelligence** both are 80 credit post graduate degree programmes conducted in 4 semesters over a period of 2 years. Each credit accounts for 15 lecture hours, or 30 supervised lab hours.
- The student is required to accumulate 80 credits towards qualifying for the award of degree. To appear in the end-sem examination the student must have an aggregate attendance $\geq 75\%$.

- Student's performance is evaluated through assignments, unit test, midterm and semestral exam in each of the theory courses. In practical/lab courses the student is evaluated through lab assignments. In Project, the students are evaluated based on presentation and written reports.
- In each course, the typical weightage for assignments, unit test, midterm and semestral exams are 15%, 10%, 25% and 50% respectively. These ratios, however, may be changed by the course instructor.

2.3 Ph.D. in Computer Science

The admissions for Ph.D. programme are open throughout the year. Important points related to the programme are given below:

a) Candidates for admission to the Ph.D. programme shall have a Master's degree or a degree declared equivalent to the Master's degree by the corresponding statutory regulatory body of the affiliating University, with at least 60% marks in aggregate or having a CGPA of 7/10 or an equivalent degree 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.

b) A relaxation of 5 percentage points, or an equivalent relaxation of grade, may be allowed for those belonging to SC/ST/OBC (non-creamy layer)/Differently-abled and other categories of candidates as per the decision of the UGC from time to time, or for those who had obtained their

Master's degree prior to 19th September, 1991. The eligibility marks of 60% (or an equivalent grade in a point scale wherever grading system is followed) and the relaxation of 5% to the categories mentioned above are permissible based only on the qualifying marks without including the grace mark procedures.

c) Ph.D. programme shall be for a minimum duration of three years, including course work and a maximum of six years from the date of admission (i.e. enrolment).

d) Extension beyond the above limits will be governed by the relevant clauses as stipulated in these Regulations.

e) The university shall admit a Ph.D. student through an entrance test followed by an interview. Candidates who have qualified NET/SET/GATE or other equivalent national-level eligibility tests may be exempted from the written part of the test and may appear directly in the interview as per the discretion of the Department concerned.

f) The credit assigned to the Ph.D. course work shall be of 16. The course work shall be treated as a prerequisite for Ph.D. preparation. The courses will be opted in consultation with the advisor such that they will aid in candidate's Ph.D. research. One such mandatory course will be Research Methodology.

g) Once admitted, the student should fill out and submit the necessary admission/registration form and pay the requisite admission fees.

Research areas include but not limited to:

Computational Geometry, Design of Algorithms, Combinatorial Optimization, Complexity Theory, Computational Ge-

ometry and Applications, Facility Location Problems, Graph Theory, Oriented Graph Coloring, Robot Motion Planning, Geometric Graph Theory and Applications, Discrete Mathematics, Algorithms: Sequential, Parallel, On-line and Approximation, Pattern Recognition, Computer Vision, Image Processing, Data Modelling, Machine Learning, Deep Learning, Optimisation.

2.4 Dress Code & Attendance

Students must adhere to a proper dress code (shirt and trousers) and maintain acceptable and decent etiquette – both in speech and behavior – while on campus.

A student is expected to maintain an aggregate attendance of at least 75%; otherwise, they will not be permitted to appear for the end-semester examinations. Consistent failure to meet this requirement across semesters may lead to expulsion from the Institute due to a lack of commitment and academic diligence.

2.5 Conduct and Discipline

It may be noted that this institute has zero-tolerance policy towards severe breach of discipline.

Ragging in any form is strictly prohibited and is considered a serious offense as it contravenes the University's honor code. Violations will result in severe disciplinary measures.

A summary of UGC regulations laid out in 2009 on curbing the menace of ragging in Higher educational institutions is given below for your reference.

PREAMBLE:

In view of the directions of the Hon'ble Supreme Court dated 8.05.2009 and in consideration of the determination of the Central Government and the University Grants Commission to prohibit, prevent and eliminate the scourge of ragging.

OBJECTIVE:

To eliminate ragging in all its forms from universities, deemed universities and other higher educational institutions in the country by prohibiting it under these Regulations, preventing its occurrence and punishing those who indulge in ragging as provided for in these Regulations and the appropriate law in force.

WHAT CONSTITUTES RAGGING:

Ragging constitutes one or more of any of the following acts:

(a) Any conduct by any student or students whether by words spoken or written or by an act which has the effect of teasing, treating or handling with rudeness a fresher or any other student.

(b) Indulging in rowdy or indisciplined activities by any student or students which causes or is likely to cause annoyance, hardship, physical or psychological harm or to raise fear or apprehension thereof in any fresher or any other student.

(c) Asking any student to do any act which such student will not in the ordinary course do and which has the effect of causing or generating a sense of shame, or torment or embarrassment so as to adversely affect the physique or psyche of such fresher or any other student.

(d) Any act by a senior student that prevents, disrupts or disturbs the regular academic activity of any other student or a fresher.

(e) Exploiting the services of a fresher or any other student for

completing the academic tasks assigned to an individual or a group of students.

(f) Any act of financial extortion or forceful expenditure burden put on a fresher or any other student by students

(g) Any act of physical abuse including all variants of it: sexual abuse, homosexual assaults, stripping, forcing obscene and lewd acts, gestures, causing bodily harm or any other danger to health or person;

(h) Any act or abuse by spoken words, emails, post, public insults which would also include deriving perverted pleasure, vicarious or sadistic thrill from actively or passively participating in the discomfiture to fresher or any other student.

(i) Any act that affects the mental health and self-confidence of a fresher or any other student with or without an intent to derive a sadistic pleasure or showing off power, authority or superiority by a student over any fresher or any other student.

MEASURES FOR PROHIBITION OF RAGGING:

There are a number of such measures at institution level, University Level, District level etc. Some of them that are important for students to know are as follows:

(a) No institution shall permit or condone any reported incident of ragging in any form; and all institutions shall take all necessary andrequired measures, including but not limited to the provisions of these Regulations, to achieve the objective of eliminating ragging, within the institution or outside.

(b) All institutions shall take action in accordance with these Regulations against those found guilty of ragging and/or abetting ragging, actively or passively, or being part of a

conspiracy to promote ragging.

(c) Every public declaration of intent by any institution, in any electronic, audiovisual or print or any other media, for admission of students to any course of study shall expressly provide that ragging is totally prohibited in the institution, and anyone found guilty of ragging and/or abetting ragging, whether actively or passively, or being a part of a conspiracy to promote ragging, is liable to be punished in accordance with these Regulations as well as under the provisions of any penal law for the time being in force.

(d) The telephone numbers of the Anti-Ragging Helpline and all the important functionaries in the institution, including but not limited to the Head of the institution, faculty members, members of the Anti- Ragging Committees and Anti-Ragging Squads, District and Sub- Divisional authorities, Wardens of hostels, and other functionaries or authorities where relevant, shall be published in the brochure of admission/instruction booklet or the prospectus.

(e) The application for admission, enrolment or registration must be accompanied by an Anti Ragging affidavit signed by a student in a prescribed format and another Anti Ragging Affidavit signed by a Parent/Guardian. (Both these Affidavits can be downloaded from the Web)

(f) Any distress message received at the Anti-Ragging Helpline shall be simultaneously relayed to the Head of the Institution, the Warden of the Hostels, the Nodal Officer of the affiliating University, if the incident reported has taken place in an institution affiliated to a University, the concerned District authorities and if so required, the District Magistrate, and the Superintendent of Police, and shall also be web enabled so as to be in the public domain simultaneously

for the media and citizens to access it.

(g) On receipt of the recommendation of the Anti Ragging Squad or on receipt of any information concerning any reported incident of ragging, the Head of institution shall immediately determine if a case under the penal laws is made out and if so, either on his own or through a member of the Anti-Ragging Committee authorised by him in this behalf, proceed to file a First Information Report (FIR), within twenty four hours of receipt of such information or recommendation, with the police and local authorities, under the appropriate penal provisions.

(h) The Commission shall maintain an appropriate data base to be created out of affidavits, affirmed by each student and his/her parents/guardians and stored electronically by the institution, either on its or through an agency to be designated by it; and such database shall also function as a record of ragging complaints received, and the status of the action taken thereon.

(i) The Commission shall include a specific condition in the Utilization Certificate, in respect of any financial assistance or grants-in-aid to any institution under any of the general or special schemes of theCommission, that the institution has complied with the anti-ragging measures.

(j) Any incident of ragging in an institution shall adversely affect its accreditation, ranking or grading by NAAC or by any other authorised accreditation agencies while assessing the institution for accreditation, ranking or grading purposes.

(k) The Commission may accord priority in financial grants-in-aid to those institutions, otherwise eligible to receive grants under section 12B of the Act, which report a blem-

ishless record in terms of there being no reported incident of ragging.

ADIMINISTRATIVE ACTION IN THE EVENT OF RAGGING:

The institution shall punish a student found guilty of ragging after following the procedure and in the manner prescribed here in under:

- The Anti-Ragging Committee of the institution shall take an appropriate decision, in regard to punishment or otherwise, depending on the facts of each incident of ragging and nature and gravity of the incident of ragging established in the recommendations of the Anti-Ragging Squad.
- The Anti-Ragging Committee may, depending on the nature and gravity of the guilt established by the Anti-Ragging Squad, award, to those found guilty, one or more of the following punishments, namely;
  (a) Suspension from attending classes and academic privileges.
  (b) Withholding/ withdrawing scholarship/ fellowship and other benefits.
  (c) Debarring from appearing in any test/ examination or other evaluation process.
  (d) Withholding results.
  (e) Debarring from representing the institution in any regional, national or international meet, tournament, youth festival, etc.
  (f) Suspension/ expulsion from the hostel.
  (g) Cancellation of admission.
  (h) Rustication from the institution for period ranging from one to four semesters.
  (i) Expulsion from the institution and consequent debar-

ring from admission to any other institution for a specified period.

- Provided that where the persons committing or abetting the act of ragging are not identified, the institution shall resort to collective punishment.
- An appeal against the order of punishment by the Anti-Ragging Committee shall lie, (i) in case of an order of an institution, affiliated to or constituent part, of a University, to the Vice-Chancellor of the University; (ii) in case of an order of a University, to its Chancellor. (iii) in case of an institution of national importance created by an Act of Parliament, to the Chairman or Chancellor of the institution, as the case may be.
- Where in the opinion of the appointing authority, a lapse is attributable to any member of the faulty or staff of the institution, in the matter of reporting or taking prompt action to prevent an incident of ragging or who display an apathetic or insensitive attitude towards complaints of ragging, or who fail to take timely steps, whether required under these Regulations or otherwise, to prevent an incident or incidents of ragging, then such authority shall initiate departmental disciplinary action, in accordance with the prescribed procedure of the institution, against such member of the faulty or staff. Provided that where such lapse isattributable to the Head of the institution, the authority designated to appoint such Head shall take such departmental disciplinary action; and such action shall be without prejudice to any action that may be taken under the penal laws for abetment of ragging for failure to take timely steps in the prevention of ragging or punishing any student found guilty of ragging.

In case, if there is any such incident it should be brought to the

notice of the authority immediately. The Indian Government also takes such untoward incidents seriously with severe actions and disciplinary measures towards the perpetuators. The National help-number for reporting such incidents is 1800-180-5522 which is operational 24×7 and email is `helpline@antiragging.in`.

2.6 Withdrawal

Once a student is admitted to this college, it is expected that he would continue until he completes his designated programme. However, due to unforeseen circumstances, if he wishes to discontinue his studies at this college he may do so. The necessary exit procedures will be intimated by the college authority to the concerned student. If it is found later that at the time of admission that the student and/or his guardian concealed certain facts that were requested by the institute or submitted false information, the student's admission may be revoked.

Students must cooperate with the authorities in maintaining the sanctity and serenity of the place by practising a perfectly disciplined life for their own benefit. Any breach of rules may lead to disciplinary proceedings, potentially resulting in expulsion from the institution.

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3. Lab Infrastructure

RKMVERI is a member institution of the National Knowledge Network (NKN). which provides us Gigabit Internet parterning with BSNL. The various units such as Academic Quarters, Hostels, and Guest Houses are internetworked by campus wide lan. Besides Hostels the rest of all the locations have uninterrrupted Wi-Fi access.

The Belur Main Campus has state-of-the-art labs interconnected by a Gigabit LAN. The list with the infrastructure details is as follows:

1. Fully airconditioned Big Data Lab equiped with high-end workstations established with the sponsorship of Tata Consultancy Services Ltd.

Big Data Lab

Machine Learning Lab

2. Fully airconditioned Machine learning lab equipped with state-of-the-art workstations, established with the sponsorship of Indian Oil Corporation Ltd.
3. The department has a dedicated multi-core server for research purposes.

GPU Resources:

Hi-Performance Computing (HPC) cluster is equipped with latest GPUs such as NVidia A100, NVidia Quadro GV100, NVidia GeForce RTX 2080 & 3080

- GPU servers powered by Asus RTX 2080 Ti graphics card
- GPU servers powered by NVIDIA RTX 3080 Founder's Edition
- HP Z8 workstation equipped with the latest Nvidia Quadro GV100 graphics Card and 64GB RAM

These HPC machines are available 24×7 hrs for remote access for the department students to run Vision, AI, and ML related projects. Using the wake-on-lan feature the servers are optimally powered by the students themselves from remote.

4. Faculty

List of faculty members in the department of computer science along with their areas of interest & specialisation:

4.1 Inhouse Faculty

Swami Sarvottamananda

Professor [PhD, IIT-Kanpur (India)].

- Vice Chancellor of the institute.
- Research interests: Computational Geometry, Center-points, Intersection Radii.

Subir K. Ghosh

Professor [PhD, TIFR/University of Bombay (India)].

- Fellow of Indian Academy of Sciences.
- Ex-Professor of TIFR-Bombay (India).
- Adjunct Professor of IIT-Kharagpur (India).
- Visiting Professor of NBHM (National Board for Higher Mathematics).
- Research interests: Computational Geometry and Applications, Robot Motion Planning, Geometric Graph Theory and Applications, Discrete Mathematics, Algorithms: Sequential, Parallel, On-line and Approximation.

Swami Shastravidyananda

Assistant Professor [M.Tech, Jadavpur University, Kolkata (India)].

- Research interests: Computational Geometry, Data Structures, Algorithms.

Sudipta Das

Assistant Professor [PhD, IISc-Bangalore (India)].

- Post-doc from *ISI-Kolkata (India)*.
- Research interests: Reliability, Stochastic Processes, Data Analytics, Real Time Systems.

Swami Punyeshwarananda

Assistant Professor, HoD [PhD, University of Queensland (Australia)].

- Research interests: Image Processing, Pattern Recognition, Machine Learning, Embedded Systems.

Br. Bhaswarachaitanya (Tamal Mj)

Assistant Professor [PhD, University at Buffalo (SUNY Buffalo), NY (USA)].

- ex-Lecturer, University of Rochester, USA
- Research interests: Artificial Intelligence, Machine Learning, Computer Vision, Decision Theory, Database Systems, Networking, Computer Security.

Joydeep Mukherjee

Assistant Professor [PhD, Institute of Mathematical Sciences-Chennai (India)].

- Research interests: Graph Theory, String Graphs, Computational Geometry.

Soumitra Samanta,

Assistant Professor [PhD, Indian Statistical Institute - (India)].

- Research interests: Data Science, Machine Learning, Computer Vision and Chem-informatics.

4.2 Adjunct Faculty

Swami Dhyanagamyananda, Adjunct Professor [PhD, Indian Statistical Institute (India)].

- Research interests: Graph Theory, Graph Coloring.

Anil Maheshwari, Adjunct Professor [PhD, TIFR (India)].

- Professor at Carleton University, Canada
- Research interests:Algorithms and Discrete Mathematics.

Sandip Das, Adjunct Professor [PhD, ISI-Kolkata (India)].

- Professor at ISI-Kolkata (India).
- Research interests: Computational and Combinatorial Geometry, Graph Theory and Combinatorics, Algorithms.

Sudebkumar P. Pal, Adjunct Professor [PhD, IISc-Bangalore (India)].

- Professor at IIT-Kharagpur (India).
- Research interests: Design and Analysis of Algorithms, Computational and Combinatorial Geometry, Graph Theory and Combinatorics.

In addition to the above faculty members, there are a number of guest lecturers from reputed institutes such as ISI, IIT and from universities abroad who are invited to give classes regularly.

5. Internships, Progression & Placements

5.1 Internships

The MSc in Data Science and Artificial Intelligence curriculum requires students to undertake a 5-month degree project during their fourth semester. This project can be completed through either a corporate internship or an academic internship at various institutes, based on their preferences.

Since the program's inception, our students have successfully secured paid internships at leading companies including TCS Pvt. Ltd, Dr. Reddy's Labs, Tata Steel Pvt Ltd, ZS Associates, Autowiz Pvt Ltd, RS Software Pvt. Ltd., Ernst & Young, Vista Intelligence, PrediQt, Voxomos, GoVivace and SenSight Technologies.

Ernst & Young's visit to RKMVERI for Campus Recruitment.

Alumni gathering @ RKMVERI: Reconnecting and reminiscing

Many of these interns have been offered permanent positions in recognition of their outstanding performance.

Typical academic internship destinations for our students include prestigious institutions such as ISI, IIT Kharagpur, IIT Patna, IIT Bombay, and INRIA, France.

The curriculum emphasizes research, involving students in cutting-edge studies in Machine Learning and Artificial Intelligence. Each year, numerous students advance to pursue research at renowned institutions such as the Indian Institute of Technology (IIT) Kanpur, Indian Statistical Institute (ISI), Chennai Mathematical Institute (CMI), Institute of Mathematical Sciences (IMSC), and our own institute. Additionally, some secure research roles at international venues like King Abdullah University of Science and Technology (KAUST) in Saudi Arabia and Nanyang Technological University (NTU) in Singapore.

5.2 Placement & Progression

Year	No. of Students	Placements	Academia
2024	20	14	3
2023	41	26	15
2022	22	16	5
2021	32	25	3

(Students of both Data Science and Artificial Intelligence and Computer Science put together)

The median salary package of the selected students from current outgoing batch (2022-24) is 7 lakhs per annum.

- **Firms & academic institutes where our alumni are working:**: Ernst & Young, Vista Intelligence, Voxomos, Cloudcraftz, Dr. Reddy's Laboratories, TCS, Citibank, HSBC, HDFC, American Express, Accenture, Univ. of Leeds, UK, IIT Mumbai, etc.
- **Institutes where our alumni are pursuing PhD**:
  In India: IIT Kanpur, IIT Bombay, IIT Hyderabad, IMSc, ISI, TCG-CRES, IIIT Delhi, NISER Bhubaneswar, RK-MVERI
  Abroad: King Abdullah University of Science and Technology (KAUST) in Saudi Arabia, Nanyang Technological University (NTU) in Singapore, National University of Singapore, TU Dresden, Germany, Inria in France, University of Grenoble Alps in France, etc.

6. Admissions

For the latest news & updates on the admissions for MSc in Computer Science, MSc in Data Science and Artificial Intelligence and PhD in Computer Science programmes, please visit our website `https://cs.rkmvu.ac.in`.

6.1 Eligibility to Apply

MSc Computer Science

- BSc Hons in computer science/engineering, BTech in any discipline, Bachelor in Computer Applications from any recognised University/Institute with 60
- BSc in Mathematics may also apply.

- Candidates (Male) who have finished studies in the above disciplines OR awaiting the results of the final exam are also eligible to apply (admission is subject to securing 60

MSc in Data Science and Artificial Intelligence

- BSc Hons / MSc (or equivalent) in any of the following disciplines: Mathematics,Statistics, Computer Science, Economics (with Econometrics), Physics (with Mathematics or Statistics as general subjects, preferred), and Electronics.
- BE/BTech/AMIE/Grad IETE/BCA students may also apply

Please Note:

- Admission for MSc in Computer Science & Data Science and Artificial Intelligence in Belur campus is open for **male candidates** only.
- Admission is subject to securing at least 60% marks in the aggregate (in the recently completed degree) or in Hons subjects for a BSc Hons degree.
- CUET candidates may also apply. Shortlisted candidates based on their CUET scores will be directly called for an interview. Visit our website for details.

6.2 How to Apply

Application forms are to be filled online. Please visit our department website: `https://cs.rkmvu.ac.in`

6.3 Fee Structure

- Academic fee for each Semester : INR 25,000/-
- Academic fee includes Fees for Tuition/Exam/ID-card, etc.
- Refundable Caution Deposit : INR 3000/-
- For Current Students: Fees payable in full within 10 days of commencement of classes of the semester.
- For Newly Admitted Students: Fees payable at the time of admission : 25,000 + 3000 = INR 28,000 /-
- Admission fees must be paid within last date as mentioned in the admission instruction

Selected candidates have to take admission by paying the requisite fees. Those who fail to take admission before the stipulated date without explicit permission from the authority will run the risk of forfeiting their admission.

6.4 Hostel Facility

Hostel facilities are available for a limited number of students who are committed to adhering to strict hostel discipline. The selection process for hostel accommodation is rigorous and involves parents to ensure better coordination. Students interested in the hostel must apply separately at the time of admission; the Hostel Application form is available at the Admission Office. Students selected for hostel accommodation will be notified separately.

For details, please visit RKMVERI Belur Campus Hostel Fees

Part Two

7. Course Syllabus

A list of courses (both core and electives) offered in MSc Big Data Analytics and Computer Science programmes is given below, respectively. On certain occasions, some of the advanced topics are taught by the professors from ISI-Kolkata, and other reputed institutions.

7.1 MSc in Data Science and Artificial Intelligence – Course List

DA100	Computing for Data Science
DA101	Introduction to Computer Science
DA108	Programming for Data Science
DA200	Database Management Systems
DA102	Basic Statistical Methods
DA103	Linear Algebra and Linear Programming

DA104	Probability and Stochastic processes
DA105	Oracle Lab
DA106	Programming in R, Python, Java, SQL
DA107	Programming for Data Science-2
DA109	Linear Algebra and Matrix Computation
DA115	Foundations of Big Data Computing
DA210	Statistics II
DA211	Supply Chain Analytics
DA220	Machine Learning
DA224	Deep Learning
DA225	Online Learning
DA205	Data Mining
DA226	Computational Data Science
DA310	Multivariate Statist
DA320	Operations Research
DA230	Enabling Technologies for Big Data
DA311	Time Series and Forecasting
DA312	Time Series and Survival Analytics
DA330	Machine Learning-2
DA240	Introduction to Econometrics
DA241	Introduction to Finance
DA242	Introduction to Econometrics and Finance
DA243	Natural Language Processing
DA321	Operations Management
DA322	Bayesian Statistics
DA341	Applied Statistics (Res course)
DA342	Applied Machine Learning (Res course)

Project

DA300	Summer/Term Project
DA400	Msc Project.

7.2 MSc in Computer Science – Course List

Theoretical Computer Science

CS200	Automata Theory
CS201	Discrete Mathematics and Logic
CS205	Introduction to Probability
CS208	Computational Mathematics
CS202	Programming Language Theory
CS302	Graph Theory
CS244	Optimization Techniques
CS240	Enumerative Combinatoris
CS112	Foundations of Statistical Learning
CS300	Theory of NP-Completeness
CS301	Computational Complexity
CS206	Probability and Stochastic processes

Programming and Systems

CS123	Concepts of Programming Languages
CS125	Programming Skill Development Project
CS220	Object Oriented Programming using Design Patterns
CS221	Compiler Design
CS222	Theory of Operating systems
CS250	Design and Implementation of Database Management System
CS229	Android Programming for Handheld Devices
CS321	Distributed Computing Systems
CS234	Computer Architecture

Algorithms

CS110	Data Structures and Algorithms
CS210	Combinatorial Algorithms
CS216	Computer Graphics and Multimedia
CS217	Image Synthesis
CS218	Algorithm for Data Science
CS314	Parallel Algorithms
CS315	Robotics Algorithms
CS317	Multidimensional Search and Computational Geometry
CS247	Optimization for Machine Learning
CS237	Introduction to Cryptology
CS239	Quantum Computing
CS241	Design and Analysis of Algorithms
CS211	Graph Algorithms
CS212	Computational Geometry
CS214	Computer Graphics(*)
CS222	Introduction to Discrete Optimization
CS310	Advanced Data structures
CS312	Approximation and Online algorithms

Artificial Intelligence

CS246	Introduction to Artificial Intelligence
CS245	Pattern Recognition
CS230	Machine Learning
CS330	Advanced Machine Learning
CS341	Speech Recognition and Synthesis
CS342	Computer Vision
CS343	Algorithms and Networking for Computer Games
CS344	Introduction to Game Theory

Project

CS300	Summer/Term Project
CS400	MSc Project work

Common Courses for Skill Development

SDA001	Presentation Skill Development
SDA002	A course on Report Writing
SDA003	Communication Skill Development (English)
SDA004	A Course on Public Speaking
SDA005	Value Thinking

Please Note:
Though all these courses have been taught in the past, this is only a tentative list and may change for the current academic year. The Department takes feedback from various sources (eg. Board of Studies, students etc.) before finalising the courses for a given semester.

Swami Vivekananda on Education

To me the very essence of education is concentration of mind, not the collecting of facts. If I had to do my education over again, and had any voice in the matter, I would not study facts at all. I would develop the power of concentration and detachment, and then with a perfect instrument I could collect facts at will.

I see it before my eyes, a nation is advanced in proportion as education and intelligence spread among the masses.

Education is the manifestation of the perfection already in man.

Education is not the amount of information that is put into your brain and runs riot there, undigested, all your life. We must have life-building, man-making, character-making assimilation of ideas. If you have assimilated five ideas and made them your life and character, you have more education than any man who has got by heart a whole library.

The secret of life is not enjoyment but education through experience.

The very reason of nature's existence is for the education of the soul; it has no other meaning; it is there because the soul must have knowledge, and through knowledge free itself.

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