



Department of Sports Science and Yoga

Ramakrishna Mission Vivekananda Educational and Research Institute

(NAAC A++ Accredited Deemed University)
Belur Math, Howrah 711202
www.rkmvu.ac.in



MSc Sports Science Program Brochure

2023-2025



Department website: <http://sy.rkmvu.ac.in/>; Email: ssy@gm.rkmvu.ac.in

Table of Content

	Page No.
1. About Sports Science	3
2. Career Opportunities	5
3. About the 2 Years M.Sc. Sports Science program	7
3.1 Aim of the course	
3.2 Objectives of the course	
3.3 Duration	
3.4 Mode	
3.5 Semester Wise Subjects & Credits	
3.6 Eligibility Criteria	
3.7 Admission Procedure	
3.8 Internship/ Project	
4. About the Department	9
4.1 Academic programs	
4.2 List of Faculty & their Research	
4.3 List of Labs and Equipment	
4.4 Memorandum of Understanding (MoU)	
4.5 Research Collaborations	
4.6 UNESCO Chair in Inclusive Adapted Physical Education and Yoga	
4.7 Athlete support & consultancy	



1. About Sports Science

Motivation, effective training, 360 degree scientific support, nutrition, tactical planning and other aspects play a role in sporting success. Sports science is a comprehensive field that integrates various scientific disciplines to enhance athletic performance, prevent injuries, promote overall health and well-being. Through the application of scientific principles and research, sports scientists play a vital role in shaping the training, nutrition, psychology, and sociological aspects of sports, ultimately helping athletes reach their full potential.

At its core, sports science aims to understand how the human body functions during physical activities and how it adapts to different training stimuli, designing effective training programs tailored to individual athletes' needs, ensuring optimal performance, analyzing movement patterns and forces to improve technique, efficiency, and prevent injury, developing mental toughness, enhance concentration, manage stress, and build resilience, also optimizing an athlete's energy levels, recovery, and overall health through proper nutrition. With advances in technology and research, sports science can help athletes of all levels achieve their goals. Moreover, sports science is not just limited to elite athletes, as it also has applications for the general population, including children and the elderly. It is used to develop effective exercise programs, improve physical fitness and health, and prevent and manage chronic diseases such as obesity and diabetes.

Sports science also delves into the sociological and cultural aspects of sport. It examines the social role of sports in society, addressing issues of inclusivity, accessibility, gender equality, and ethical considerations. By understanding the broader social context, sports scientists contribute to



policies and initiatives that promote fair play, diversity, and the well-being of athletes and sports enthusiasts. Overall, sports science is a rapidly evolving field that has the potential to revolutionize the way we approach sports and exercise.

Sports Science Education in India

Sports science education in India has come a long way since its inception and witnessed significant growth and development over the years. Around the mid-20th century, sports science education in India was relatively limited. Most sports training and coaching programs focused on technical skills and physical conditioning, with little emphasis on the scientific aspects of sports performance. The development of sports science education can be traced back to the establishment of the National Institute of Sports (NIS) in 1961 at Patiala which later became Netaji Subhas National Institute of Sports (NSNIS) to provide scientific training to Indian athletes.

The establishment of sports science departments at the universities in India played a pivotal role in the evolution of sports science education. Over time, educational institutions recognized the need for sports science education and started offering specialized courses. Today, several universities and colleges across the country started offering undergraduate and postgraduate programs in sports science and related specialized courses like exercise physiology, biomechanics, sports nutrition, sports psychology, sports management, and etc. The Government of India has also taken various initiatives to promote sports science education. The Ministry of Youth Affairs and Sports has encouraged the establishment of sports science departments in universities and colleges. In recent years, India has witnessed the establishment of several new institutions dedicated to the upgradation of sports education. These institutes are playing a crucial role in advancing the field of sports science and nurturing talented individuals in the country. The National Centre for Sports Science and Research (NCSSR) is one such institute established that offers cutting-edge facilities and focuses on research and innovation in sports science and sports medicine, enabling athletes and researchers to study and enhance athletic performance.

Similarly, from 2015, RKMVERI Belur has started expanding the educational opportunities for aspiring sports science professionals but is also promoting a research-oriented culture. With state-of-art advanced infrastructure, expert faculty, and research opportunities, the institute department is instrumental in elevating the standard of sports science and yoga education in India and nurturing the next generation of sports scientists, coaches, and professionals.

However, there is still a long way to go in terms of promoting sports science research and education, and more efforts are needed to develop world-top ranked sports science facilities and programs in India.

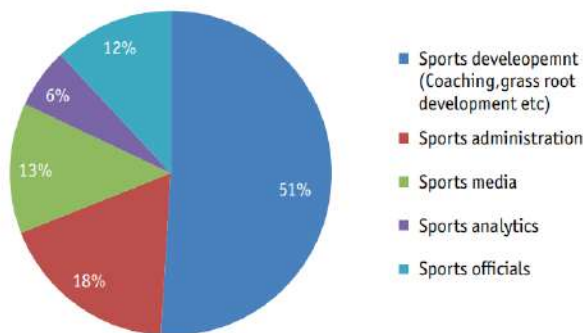
Sports Science Education in India



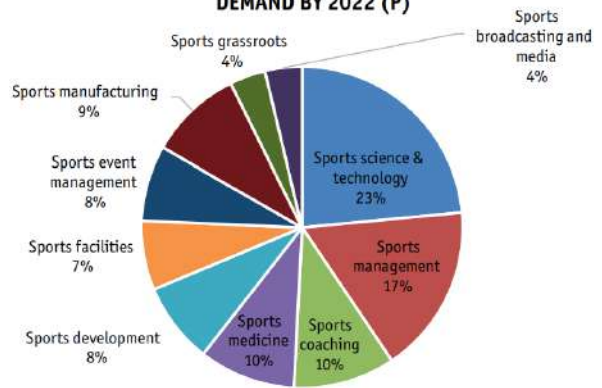
2. Career Opportunities

Career options in sports are diverse and offer exciting prospects for individuals passionate about the field. According to statistics, the global sports market is valued at over \$600 billion, showcasing the immense potential for growth and career advancement in this dynamic industry. With the right skills and dedication, individuals can pursue fulfilling careers while contributing to the world of sports.

Career Options in Sports



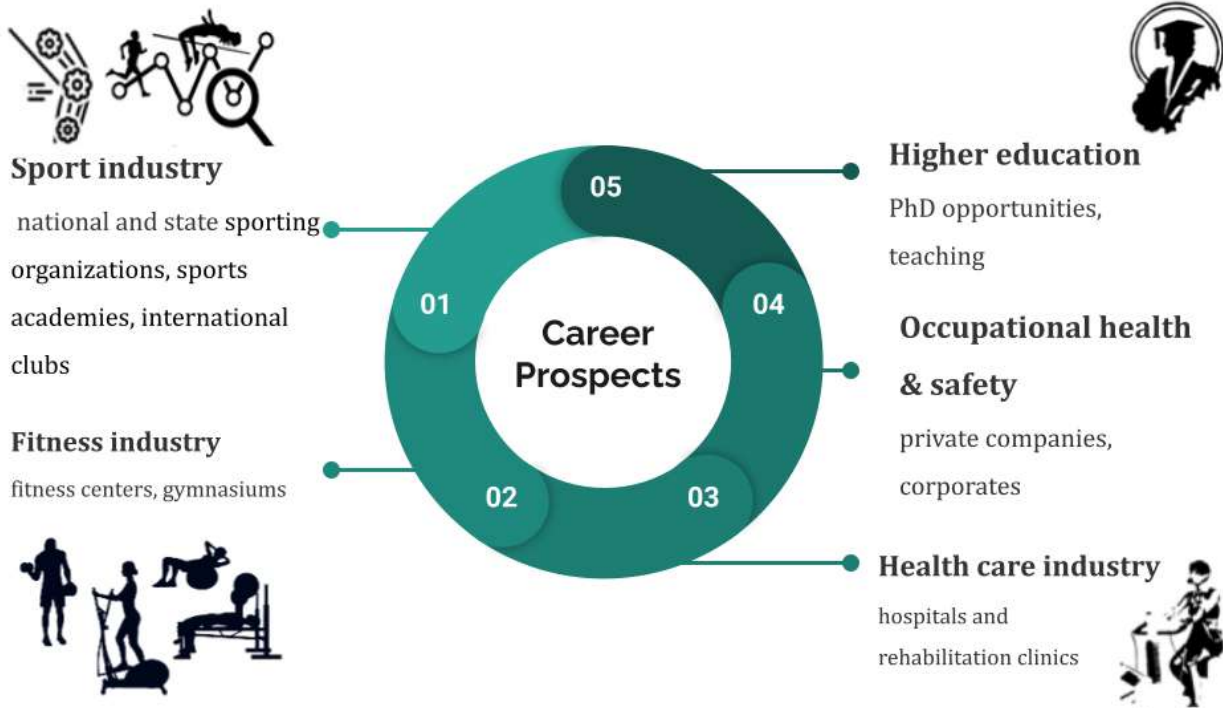
DEMAND BY 2022 (P)



SR NO.	CATEGORY	DEMAND BY 2022 (P)	% OF TOTAL
1		10,27,681	26%
2	Sports management	7,45,984	19%
3	Sports coaching	4,47,396	11%
4	Sports medicine	425839	11%
5	Sports development	356769	9%
6	Sports facilities	304841	8%
7	Sports event management	332667	8%
8	Sports manufacturing	410040	9%
9	Sports grassroots	157880	4%
10	Sports broadcasting and media	162578	4%
11	Total	4371675	100%

Source: 2014: Sector Skill Council Vision Document FICCI

Sports science students have a wide range of career opportunities, including sports scientists, performance analysts, strength and conditioning coaches, exercise physiologists, sports nutritionists, sports psychologists. They can also work in research and development, sports academies, fitness centers, sports medicine clinics, sports management, journalism, and education.



Career opportunities in sports science are vast and cannot be limited to a laboratory. By observing the requirement of knowledgeable personnel in sporting organizations and the goal of a student, career opportunities can be divided in three major clusters -

1. **Education:** A post-graduate of sports science can apply for teaching positions in colleges as per UGC guidelines.
2. **Research:** Postgraduate students in sports science with expertise in laboratories testing, equipment handling, research aptitude may apply for the post of researcher or research associates in sports organizations.
3. **Consultancy:** A post-graduate from sports science may provide consultancy of their expertise to sportsperson, coaches, sports academies during planning a training programme, athletic rehabilitation, athletic screening, performance assessment and many more.

3. About the 2 Years M.Sc. Sports Science program

3.1. Aim of the course

The aim of the course is to propagate and promote scientific support to sports

3.2 Objectives of the course:

1. To have an integrated knowledge of the various disciplines in multidisciplinary field of Sports Science.
2. To introduce basic concepts of human body, health and wellness through sports so as to make the understanding clear about the benefits of sports.
3. To train personnel on scientific aspects of sports and practice for real life problem solving in an increasingly complex and dynamic sports world.
4. To gain hands-on experience in laboratory techniques, sports analytics, and enhance problem-solving skills in sports-related issues.
5. To develop the ability of focused research and thinking process mastering complex skills that are grounded in and guided by systematic theory and research.
6. To emphasize ethical practices in sports science research and application.

3.3 Duration: Duration of the course is 4 semesters (**2 Years**)

3.4 Mode: The MSc Sports Science program is **Regular, full time**

3.5 Semester Wise Courses with Credits

Semester 1			Semester 2		
Sl	Courses	Credits	Sl..	Courses	Credits
1	Computer Applications	2	1	Sports Medicine, Ergogenic aids & Doping	3
2	Introduction to Human Anatomy	2	2	Sports Psychology	3
3	Introduction to Human Physiology	4	3	Exercise Physiology	4
4	Biomechanics of Human Movement I	2	4	Biomechanics of Human Movement II	4
5	Nutrition & Metabolism	4	5	Bioenergetics & Exercise Metabolism	3
6	Sports Coaching & Training Methods	4	6	Kinesiology	3
7	Introduction to Psychology	2	7	Physiology of Yogic Practices	2
Semester TOTAL		20	Semester TOTAL		22
Semester 3			Semester 4		
Sl.	Courses	Credits	Sl.	Courses	Credits
1	Research Methodology & Biostatistics	3	1	Internship / Dissertation	8
2	Communication Skills & Writing	1	2	SWAYAM courses	10*
3	Games of Specialization	4	*total credits=10 (minimum)		
4	Elective Course 1	3			
5	Elective Course 2	3			
6	Elective Course 3	3			
7	Elective Course 4	3			
Semester TOTAL		20	Semester TOTAL		18

Elective courses: Applied Sports Physiology; Environmental Exercise Physiology; Strength & Conditioning; Clinical Exercise Physiology; Sports genetics and performance; Sports Rehabilitation, Neuroscience of Exercise and Sports

SWAYAM courses: Sports Administration and Management, Mechanics of Human Movement, Cognitive Psychology, Nutritional and Biochemistry

Note: The curriculum has been revised according to the new directive National Credit Framework (NcrF) 2022 under NEP 2020

3.6 Eligibility Criteria

1. Three years B.Sc. in Sports Science / B.Sc in Exercise & Sports Science / B.Sc. in Exercise Physiology / B.Sc. in Sports Science and Physiology / B.Sc.Physical Education / B.Sc. in any discipline of Physical or Biological Sciences of a recognised University with minimum 50% marks in aggregate (45% for reserved category)
2. B.E./B.Tech in any discipline with minimum 50% marks (45% for reserved category)

3.7 Admission Procedure

1. Admission is conducted through CUET and/or RKMVERI admission test. Candidates should qualify the CUET PG exam paper code COQP18 or COPQ20. An interview/counseling is conducted after screening based on the admission test score.
2. For details of application procedure and other formalities please refer to <https://sy.rkmvu.ac.in/admission-msc-ss/>

3.8 Internship/ Project

During the program, sports science students will get various internship opportunities.

Internship Prospects



& etc. ...

4. About the Department

In the year 2012, the University established a full- fledged academic department to promote scientific study and research related to sports, including adapted sports, and yoga - 'Department of Sports Science & Yoga'. The five-storey building christened as 'Atma-Vikas' (literally, five-layered self-development) houses the Department of Sports Science and



Yoga, equipped with modern laboratories and classrooms, state-of-the-art conference room, a fully functional fitness center and huge Yoga halls, dedicated exclusively to teaching and research in the fields of Sports Sciences and Yoga.

Ramakrishna Mission is well known for its contribution in this field of education in India. The Ramakrishna Mission Vivekananda University (presently named RKMVERI) was established in 2005, under Section 3 of University Grants Commission (UGC) Act, 1956, in order to promote education and research in selected “thrust” areas – of which adapted sports and yoga were one of the important areas. In the year 2012, the University established a full-fledged academic Department to promote scientific study and research related to sports, including adapted sports, and yoga. The Department initially operated from the IRDM Narendrapur campus. A PG Diploma in Sports Science was started in 2012. The department sustained the initial years by contributing in e-PG Pathshala programme of MHRD and embarking on research activities. In 2017 the Department started operating from the Belur campus and launched the PhD program in Sports Science. In the same year the one year full-time PG Diploma in Yoga was also launched. Subsequent year was the start of PhD program in Yoga. Sincere efforts by many dedicated faculty members led to the stage where several programmes on sports science and yoga could be introduced within a few years of the genesis of the department. Recognizing the services of Ramakrishna Mission to mankind, UNESCO instituted a Chair (UNESCO Chair) in the field of “Inclusive Adapted Physical Education and Yoga” at the University in the year 2012.

4.1 Academic Programs

The Department of Sports Science and Yoga of the University offers the following programs–

1. Ph.D. in Sports Science
2. Ph.D. in Yoga
3. M.Sc. in Sports Science (Two Years Full time course)
4. M.Sc. in Yoga (Two years Full-time course)
5. PG Diploma in Yoga (One year Full time Course)
6. Certificate Course in Yoga and Naturopathy (Six months course)

4.2 List of Faculty & their Research Interest (<https://sy.rkmvu.ac.in/faculty/>)

Name	Area of Expertise	Highest degree & alma Mater
Swami Vidyapradananda <i>Head of Department, DSSY, RKMVERI Belur</i>	Yoga: Patanjali Yoga & Bharatiya Manovigyan, Physiological and neural correlates of pranayama techniques, Yoga Upanishads	Ph.D. in Operations Research from <i>The Pennsylvania State University, USA</i>
Dr. Kalipada Pal <i>Associate Professor, DSSY, RKMVERI Belur</i>	Ayurveda, Panchkarma, Naturopathy	M.D. (Ayurveda) from <i>University of Calcutta</i>
Dr. Arkadeb Dutta <i>Assistant Professor, DSSY, RKMVERI Belur</i>	Neurophysiology & Cognition: Event-related markers of perception, attention and cognition, functional brain neuroplasticity using non-invasive methods (EEG & fMRI), neural correlates of cognition and behaviour using invasive techniques in animal models, behaviour oriented classification of interneuronal sub-types.	Ph.D. in Physiology from <i>Defence Institute of Physiology & Allied Sciences, Delhi,</i> Post doctoral fellow at <i>University of Freiburg, Germany, Technion, Israel and National Brain Research Center, Manesar</i>
Dr. Kunal Sikder <i>Assistant Professor, DSSY, RKMVERI Belur</i>	Sports Biochemistry: Diabetic cardiomyopathy (DCM), Cardiac inflammation, Intracellular cross-talks in diseased heart, iPSC culture and differentiation, Myocyte and fibroblast culture, Genetic manipulation in animal model and in vitro system	Ph.D. in Physiology from <i>University of Calcutta</i> Post doctoral fellow at <i>Center for Translational Medicine, Dept. of Medicine, Thomas Jefferson University, Philadelphia, USA</i>
Dr. Subhadip Paul <i>Assistant Professor, DSSY, RKMVERI Belur</i>	Computational Neuroimaging: Non-invasive structural and Function MRI of human brain, computational modeling of MRI signal, investigation of the human brain circuit dysfunctions in gait-related and other disorders. Pain management is one specialized area	Ph.D. in Computational Neuroscience from <i>National Brain Research Center, Gurgaon</i> Post doctoral: Newton International Fellow, <i>Institute of Psychiatry, Psychology & Neuroscience, King's College London,</i> Researcher at <i>MIND Institute, USA</i>
Dr. Arnab Das <i>Assistant Professor, DSSY, RKMVERI Belur</i>	Sports & Exercise Physiology: Cardiorespiratory demand of sports, Exercise responses at altered environment, Physiology of yoga Fitness assessment & interpretation: Lab based, Field based	Ph.D. in Physiology from <i>University of Burdwan</i> Research Fellow at <i>Sports Authority of India, Bangalore</i>
Dr. Manohar Kumar Pahan <i>Assistant Professor, DSSY, RKMVERI Belur</i>	Sport Psychology: Psychological Intervention, athletic potential management, long-term athletic development, normative data-hub, Sports Training: Program design, Strength & conditioning, movement education, athlete assessment	Ph.D. in Sport Psychology from <i>Lakshmibai National Institute of Physical Education, Gwalior</i>
Dr. Rangaraj Giridharan <i>Associate Professor & Head, GAPEY, RKMVERI Coimbatore</i>	Adapted Physical Activity: Curriculum Development and Delivery of Inclusive Adapted Physical Activity, Design and Development of Adapted Sports Gadget	Ph.D. in Physical Education from <i>Bharathiar University</i>

Dr. J. Viswanathan <i>Assistant Professor GAPEY, RKMVERI Coimbatore</i>	Performance analysis: software based movement analysis. Exercise physiology: basketball training, tapering & peaking.	Ph.D in Physical Education from <i>Bharathidasan University, Tiruchirapalli</i>
Dr. Vijmendra Kumar Grover <i>Assistant Professor GAPEY, RKMVERI Coimbatore</i>	Exercise Physiology: Sports genetics, molecular exercise physiology Strength & Conditioning: Boxing	Ph.D. in Exercise Physiology from <i>Lakshmibai National Institute of Physical Education, Gwalior</i>

4.3 Sports Science Laboratories and Equipments (<https://sy.rkmvu.ac.in/ssy-labs/>)

The Department of Sports Science and Yoga is housed in a recently built (in 2018) five-storey building christened as 'Atma-Vikas' (literally, five-layered self-development), and is equipped with

- ❖ **Eight state-of-the-art laboratories,**
- ❖ **Four ICT enabled classrooms,**
- ❖ **One state-of-the-art conference room with v-con facility,**
- ❖ **One state-of-the-art auditorium hall with 120 seating capacity and v-con facility,**
- ❖ **One fully functional fitness center with multi-gym**

The state-of-art well equipped eight laboratories are -

i) Kinanthropometry laboratory:

High resolution weighing machine (AVERY - Weigh-Tronix)
Body composition analyzer cum stadiometer (Jawon Medical - ioi 353)
Anthropometric rod
Anthropometric tape
Skinfold calipers (Harpenden & Holtain)
Sliding caliper

ii) Exercise Physiology & clinical evaluation laboratory:

CPET metabolic cart (Cosmed - Quark CPET)
Peak bike (Monark - Ergomedic 894E)
Cycle ergometer (Monark - Ergomedic 828E)
Treadmill (Turbuster - TR6800DI)
Rowing ergometer (Concept II model D)
Bicycle ergometer (Axos Kettler - Cycle P)
Blood lactate analyzer (Arkray - Lactate Pro2)
Spirometer (in-built in COSMED CPET)
ECG (BPL CARDIART - 6208 VIEW)
Heart rate monitor and watch (Polar - V800, H7, H10)
Sphygmomanometers (Dr. Morepen - bp-02 & Omron HEM-8712) & stethoscopes
Pulse oximeter (MEDITIVE - MPO-03)



Pulse oximeter (ONIDEK - Finger Pulse Oximeter 6500)
 Digital hand grip dynamometer (CAMRY - EH101)
 Digital hand grip dynamometer (Takei - T.K.K 5401)
 Digital back-leg strength dynamometer (Takei - T.K.K 5402)
 Sit and reach box
 Metronome
 Microscope (GEMKO LABWELL G. S. 725)



iii) Biochemistry laboratory

(located at School of Biological Sciences, Ramakrishna Mission Seva Pratishthan, Kolkata)

Electrolyte Analyzer
 Cooling centrifuges & centrifuges (Thermo Fisher & Remi)
 Microplate reader
 UV-vis Spectrophotometer
 Nanodrop
 Gel electrophoresis apparatus (BioRad)
 Gel doc
 PCR-Thermal cyler
 -80°C Freezer
 -20°C Freezer
 4°C Refrigerator
 Precision weighing scale
 Precision Pipettes Autoclave Sterilize



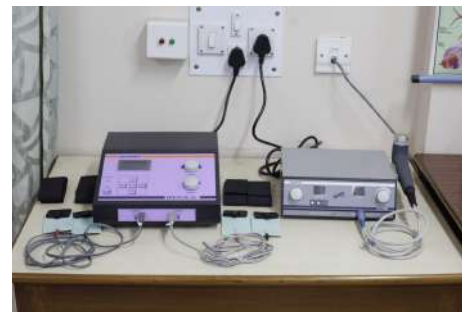
iv) Strength & Conditioning laboratory:

Cross trainer (Welcare WC-508)
 Spinning bike (Welcare)
 Lifting platforms
 Barbells and weights set
 Training disks
 Resistance bands
 Dumbbell set



v) Rehabilitation laboratory:

Ultrasound therapy unit (Bhogilal pvt. ltd.)
 Traction unit (Bhogilal pvt. ltd.)
 Foam roller
 Medicine ball
 Hydrotherapy & Steam bath
 Interferential Therapy Unit (Bhogilal pvt. ltd.)
 Theraband High & Mini Loop
 Resistance Band
 Rectangular Balance Board
 Circular Balance Board
 Swiss Ball
 Models of various joints



vi) Neurophysiology & Cognition Laboratory:

RMS-Brainview Plus 24 Channel Digital EEG machine
 RMS Digital Polyrite System. "Polyrite D"
 Multichannel Bio-potential recorder "RMS" Multipara Patient Monitor (Phoebus P512)



vii) Sports Psychology Laboratory


Biofeedback and neuro-feedback for GSR, Temp, Pulse Rate, Respiration, EMG, EEG (Alpha) (CBF-206 PSYCHOFEEEDBACK)

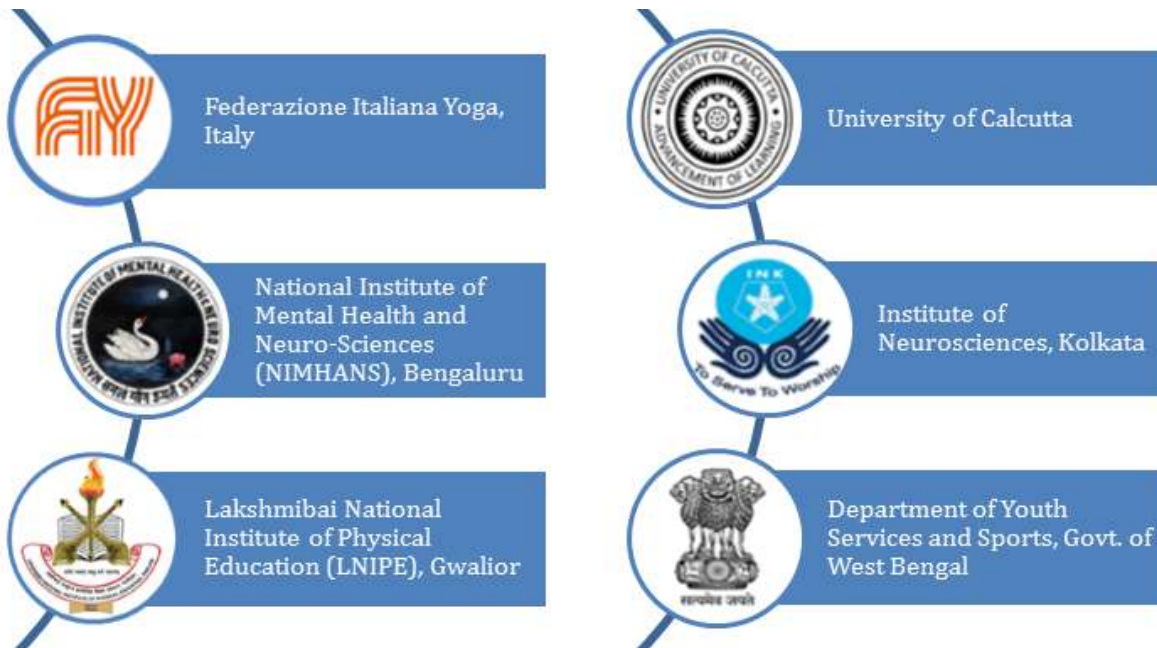
viii) Kinesiology Laboratory

High speed cameras (GoPro HERO7 Black)
 OpenBCI Cyton wearable bio-sensing module for EMG recording (eight channel)
 IDUN DRYODE™ ALPHA KIT



4.4 Memorandum of Understanding (MoU)

The  Department of Sports Science & Yoga, RKMVERI currently has active MoUs (<https://sy.rkmvu.ac.in/mou-other-institutes/>; <https://sy.rkmvu.ac.in/mou-lnipe-gwalior/>) with the following organizations -



4.5 Research Collaborations

The department has active research collaborations with the following institutions -



Institute of
Neurosciences
Kolkata

The Mind
RESEARCH NETWORK
FOR NEURODIAGNOSTIC DISCOVERY

4.6 UNESCO Chair in Inclusive Adapted Physical Education and Yoga

The department holds the very prestigious UNESCO Chair in the area of 'Inclusive Adapted Physical Education and Yoga' (1004), which was established in 2012 at Ramakrishna Mission Vivekananda Educational and Research Institute for activities in the field of inclusive adapted physical education and yoga (<https://sy.rkmvu.ac.in/unesco-chair/>). This Chair is first of its kind in the field of 'Inclusive Education' in Asia. Establishment of the chair during the 150th Birth Anniversary of Swami Vivekananda is a significant step towards realization of his vision of education for life-building, man-making and character building by combining the best elements of the East and the West.



Objectives of the Chair:

- Carry out research in inclusive physical education in collaboration with partners, and disseminate research results widely;
- Design an orientation programme in inclusive adapted physical education, and provide training to staff working in schools and colleges;
- Organize seminars and conferences to facilitate networking and the sharing of knowledge and good practices; and,
- Strengthen links and cooperation with local and international institutions active in the field of inclusive adapted physical education, to achieve the above objectives.

4.7 Athlete Support & Consultancy (<https://sy.rkmvu.ac.in/extension-activities/>)

The Department of Sports Science & Yoga, RKMVERI is also dedicated to provide sports science support to the athletes & coaches on demand both in the field and in the laboratories of RKMVERI. The department has provided sports science support to table tennis players of Bengal Table Tennis Academy, bengal team footballers of Santosh Trophy team, tennis players of BENGAL TENNIS ASSOCIATION (BTA), footballers of Chandannagore Sporting Association, table tennis players of State Sports Academy, Miao, Arunachal Pradesh and etc.

