



TAMIL NADU PHYSICAL EDUCATION AND SPORTS UNIVERSITY

Melakottaiyur, Chennai-127

INSTITUTIONAL DISTINCTIVENESS

INNOVATIVE LABORATORIES FOR DISSEMINATION OF SPORTS KNOWLEDGE

Background

During the previous decade, Indian sports have experienced amazing growth. Despite the efforts of the Governments and respective sports federations in developing sports in India, significant progress has not been made at the international level due to lack of access to the newest technology and expertise by players and coaches. As a result, it is critical to teach the latest sports technology to athletes and coaches so that they can improve their sports performance by modifying their regular sports training.

1. Center of Excellence in Biomechanics

The Centre of Excellence in Biomechanics in the University campus established at a cost of ₹13.09 crores and funded by the Tamil Nadu Innovative Initiative Scheme of Government of Tamil Nadu, spans in an area of 21,000 square feet. As the largest sports biomechanics lab in South Asia, equipped with advanced sports biomechanics equipment, including a 3D motion capture system with 14 cameras, 38 force plate locations, a 32-channel EMG system, an anthropometry chair, and an isokinetic dynamometer. The lab operates with advanced software like

QTM, Visual 3D, BioWare, and MARS. It serves students, researchers, and academicians in sports science and physiotherapy, as well as novel and elite athletes of all sports and games at all levels. The facility conducts biomechanical assessments for athletes ranging from high school to elite levels to enhance sports performance, identify talents and avoid injuries. Many State, National and International athletes and teams, PhD Research scholars and the students of this University and other Institutions have benefitted from this Center. This Centre stands as a model Sports Biomechanics for the whole country with potential service to the sports fraternity which paves a way for enriching sports biomechanics fraternity and sports science at large.

2. Computerized Low-Speed Subsonic Wind Tunnel Laboratory

The Computerized Low-Speed Subsonic Wind Tunnel Laboratory, funded by the State Government of Tamil Nadu, was established with a total investment of ₹30.61 lakhs. This laboratory is equipped with a sophisticated low-speed wind tunnel precisely controlled by advanced computer systems, ensuring high accuracy and reliability in experimental results. The significance of this laboratory lies in its impact on sports science and engineering, influencing various aspects of athletic performance, equipment design, and overall sports innovation. The facility includes advanced machines and equipment such as the wind tunnel, a computer, and four balls for testing. Beneficiaries of this laboratory include teams and coaches, Ph.D. researchers in sports technology, engineers pursuing their master's in sports technology (M.Tech.) and athletes aiming to improve their performance. This laboratory helps to enhance Athletic performance, Innovative Sports Equipment design, Advanced Research and Development, Educational Advancements, Collaboration and Innovation, Regulatory and Safety Improvements, Environmental Sustainability, Better Prepared Athletes and Overall Sports Advancement.

3. Computational Sports Technology Laboratory

The Computational Sports Technology Laboratory leverages industry-leading software to drive innovation in sports science and engineering, utilizing licensed versions of ANSYS Fluent on five systems for comprehensive Computational Fluid Dynamics (CFD) simulations funded by the State Government of Tamil Nadu with a total investment of ₹12,56,599/-. The lab is significant for its advanced aerodynamic analyses, motion assessments, and data-driven research essential for optimizing sports equipment, enhancing athlete performance, and preventing injuries. The lab is equipped with six computers, a 3KV inverter, a printer, five-user licensed ANSYS software, one-user licensed Dartfish software, and a Basler high-speed camera. Beneficiaries include teams and coaches, Ph.D. research scholar in sports technology, M.Tech. engineering students specializing in sports technology, and athletes seeking to improve their performance. This Laboratory leads to optimized sports gear that enhances performance, improves athlete safety through injury prevention strategies, and fosters continuous advancements in sports technology.

4. Exercise Physiology and Sports Nutrition Laboratory

Cardiovascular and pulmonary fitness significantly influence the potential for successful performance in various sports and athletic competitions involving aerobic and anaerobic energy systems. This laboratory focuses on helping students to understand the determinants of physical activity and energy expenditure. It aims to develop in-depth knowledge and practical skills in Exercise Physiology and Sports Nutrition, ensuring a scientific basis for these fields. This lab helps the athletes to know the daily nutritional requirements especially during training and National and International events to give the best performance. Equipped with a stadiometer, rowing machine, cardiopulmonary and metabolic assessment tools, bioelectric impedance, blood pressure assessment devices, strength testing equipment,

flexibility assessment tools, and diet counseling services. The lab offers a comprehensive foundation in Exercise Physiology and Sports Nutrition. Students can apply nutrition principles and explore the interactions between diet, exercise, and health based on the latest research evidence in a practical environment. As many as 30 State, 110 National and International athletes, 320 students and scholars have benefitted from this laboratory. The laboratory seeks to promote the health, fitness through research, and prepare students for professional roles in promoting optimum health and wellness of individuals and diverse communication through the application and integration of exercise physiology and Sports Nutrition, dietetics.

5. Sports Psychology Laboratory

The Sport Psychology Lab of the Tamil Nadu Physical Education and Sports University was established in the academic year 2017-2018, funded by a project from the Sports Science Centre under Tamil Nadu Innovative Initiatives Scheme of Government of Tamil Nadu. This lab is significant for its seamless blend of theoretical knowledge and practical application, offering students and scholars invaluable hands-on experience. By focusing on the psychological aspects of athlete participation and performance, the lab enhances the understanding and practical application of sports psychology principles in a meaningful way. The lab is equipped with advanced machines and equipment, including, Sports Vision Trainer with a 32-sensor pad (SVT™ Professional software), EMG Biofeedback Trainer. The primary beneficiaries of this lab are students, scholars/researchers, athletes, coaches, and sports science professionals. Athletes, in particular, receive specialized counselling and support to optimize their psychological preparation and performance in sports competitions. The hands-on learning opportunities in Sports Psychology lab simplify complex theories and concepts, making them more accessible to students. By actively engaging with the tools and apparatus, students not only deepen their

understanding but also develop a heightened interest in the subject matter throughout their education.

Conclusions:

Sports Performance is not unidimensional but multi-dimensional. Several factors are influencing sports performance. The functioning of these Sports Science Laboratories together is mandatory to follow scientific training. Ultimately, it will help our athletes to enhance their sports performance to achieve in international competitions. In this way, this University contributes significantly to the growth of sports and games in this country.
