About the programme

Robotics, the branch of technology that deals with the design, construction, operation, and application of robots, has become a highly relevant and upcoming discipline. It is being increasingly applied to almost every field of activity including improving the standard of living of humans, handling dangerous and hazardous situations, relieving mankind of repetitive and tiring activities, exploring outer space and performing complex medical procedures.

Many industries also use robots in their manufacturing facilities and research. For instance, robots are used in areas like high heat welding and continuous handling of heavy loads. They can function tirelessly even in the most inhospitable working conditions. Owing to this, robots are taking over from man most of the manipulative, hazardous and tedious jobs in factories, mines, atomic plants, space ships, deep-sea vessels, etc. The automation of work through robotics has led to substantial increase in productivity in these areas.

The Amrita University Robotics and Automation M.Tech program is unique in that it provides an academic curriculum that pulls from mechanical engineering, electronics and instrumentation engineering and computer science disciplines, exposing the students to the breadth of and interdependence among the engineering disciplines and offering the students exactly what is required to master the technical knowledge required.

This programme will provide a comprehensive educational environment and enable students to gain expertise in next generation robotics and automation systems. By exposing our students to course work from multiple disciplines and preparing them to think about robotics from a holistic approach, our program will prepare a skilled industry workforce as well as expert researchers who will be able to provide leadership in a world that is increasingly dependent on technology.
Faculty

Prof Bhavani B
- **Director**, AMMACHI Labs, Amrita Vishwa Vidyapeetham
- Research interests: Human computer interaction, learning technologies, disaster risk reduction, vocational education and training.

Dr. Balakrishnan Shankar
- **Associate dean**, Amrita Vishwa Vidyapeetham and Professor and chairperson, Mechanical engineering
- Research interests: Materials science.

Dr. Ganesh Udupa
- **Professor**, Mechanical engineering
- Research interests: Robotics, precision engineering, optical instrumentation, nanometrology.

Dr. Rajan Sundaravaradhan
- **Assistant Professor**
- Research interest: Number theory

Gayathri Manikutty
- **Senior researcher**, AMMACHI Labs
- Research interests: Embedded system design, and robotics.

Srinivasan Shankar
- **Senior researcher**, AMMACHI Labs
- Research interests: Mechatronics design.

Ajith Peter
- **Visiting professor**, Amrita Vishwa Vidyapeetham
- Research interests: Computational engineering, embedded systems, software defined radios.

Unnikrishnan R
- **Research associate**, AMMACHI Labs
- Research interests: Intelligent tutor systems, medical rehabilitation, motor control and learning.

Adjunct Faculty
- Dr. Ramachandra M. Kaimal, Professor, Amrita School of Engineering Amritapuri
- Dr. Latha Parameswaran, Professor, Amrita School of Engineering Coimbatore
- Dr. C. Shanmugha Velayutham, Associate Professor, Amrita School of Engineering Coimbatore
- Dr. Sreeja V.K., Assistant Professor, Amrita School of Engineering Amritapuri
- Dr. Anand Ramachandran, Professor, Amrita Center for Wireless Network and Applications
- Preetha P K, Assistant Professor, Amrita School of Engineering Amritapuri
Board of Studies

- Prof Bhavani B, Amrita Vishwa Vidyapeetham
- Dr. Balakrishnan Shankar, Amrita Vishwa Vidyapeetham
- Dr. Ramachandra M. Kaimal, Amrita Vishwa Vidyapeetham
- Dr. P S Chandramohan Nair, Amrita Vishwa Vidyapeetham
- Dr. T S B Sudarshan, Amrita Vishwa Vidyapeetham
- Dr. Subhasis Chaudhuri, Indian Institute of Technology, Mumbai
- Dr. K. Kurien Issac, Indian Institute of Space Science and Technology
- Dr. Kenneth Salisbury, Stanford University
- Dr. Margaret Minsky
- Dr. Brent Gillespie, University of Michigan
- Dr. Venkat Krovi, State University of New York at Buffalo
- Dr. Ron Lumia, University of New Mexico
- Dr. Raj Madhavan, University of Maryland
- Dr. Prahlad Vadakkepat, National University of Singapore

Infrastructure & Lab

- Robotics and Control Systems Lab
- Embedded Systems Lab
- Machine vision and machine learning lab
- Automation lab

International Alliances

AMMACHI Labs has international collaboration with universities in US and Europe including

- Stanford University
- University at Buffalo, The State University of New York
- University of Michigan
- University of New Mexico
- University of Maryland
- Memorial Sloan-Kettering Cancer Center
- Technische Universitat Munchen (TUM), Germany
- Ecole Polytechnique Federale De Lausanne (EPFL), Switzerland
- National University of Singapore
Funded Projects

Computerized Vocational Education Training using Haptics (SAVE):
The goal of the SAVE project is to foster technological innovation in vocational training to help alleviate poverty and to preserve dying skills. SAVE has developed educational applications using multimedia, virtual reality and haptic technologies.

Women Empowerment (WE): a UNDEF funded project for Life Enrichment and Vocational Education Training AMMACHI Labs has empowered over 3,000 women with the ability to participate in the democratic process through providing vocational and life enrichment education through ICT and CVET (Computerized Vocational Education Training).

Mobile Vocational Education (MoVE):
AMMACHI Labs has developed Mobile Vocational Education – MoVE, which utilizes fully equipped vehicles powered by solar energy to provide vocational education to logistically and geographically diverse areas. The deployment methodology and outreach varies from rural areas to tribal regions.
About the Department / Center

AMMACHI labs is a multidisciplinary research center of Amrita University with a focus in technological innovation for social impact in the field of computer-human interaction, haptics, multimedia and virtual reality, with application areas in education, healthcare, defense and disaster preparedness. Even as India’s economy booms, and the demand for skilled workers rises, vocational training in India is effectively paralyzed by social stigma, budget constraints and inadequate numbers of trainers and materials. Born out of the demand for accessible, standardized vocational education in India, available at dispersed locations to a diverse population, AMMACHI Labs has developed full-package solutions which can address the most crucial areas in the way of meeting India’s training goals: multi-media enriched computerized training modules and life enrichment education curriculum, groundbreaking uses of haptic technologies, and a first-of-its-kind solar-powered Mobile Vocational Education (MoVE) unit. AMMACHI labs extends Amrita University’s unswerving focus on providing effective value-based education to include skill development at all levels and in numerous disciplines.
Research at AMMACHI Labs spans a wide range of focus areas including

**Haptic Technology**
Application of cutting edge haptic technologies for skill training that recreate the force sensations experienced in real life. The haptic devices are designed to be cost effective and provide skill training and assistance.

**Virtual Reality**
3D game engines & motion tracking technologies to increase the immersive feel of virtual simulation environments. In addition to vocational training these technologies also go into creating disaster preparedness training.

**Serious Games**
Serious games are designed to bring a degree of fun and competitiveness into educational training and also to teach important skills that get transferred to the real world. AMMACHI Labs integrates elements of serious games across the training process.

**Medical Rehabilitation**
India is home to a huge population with little or no access to post surgery, post trauma medical rehabilitation. AMMACHI Labs in collaboration with the Amrita Institute of Medical Sciences (AIMS) research on medical technologies using robotics, haptics and motion tracking aiming to design them to be affordable, robust and scalable.