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[15] A Urooj, R Radhakrishnan, New robust state-estimation frameworks for angles-only underwater target tracking problems, International Journal of Adaptive Control and Signal Processing, Wiley, 2023

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[17] Srilekha,MK, Deepa SN, Shanker, Human Fatty Liver Volume Measurement Device using Nano Graphene Polyvinyl Sensor, IEEE Sens. J.. vol. 23, no. 20, 2023

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Notable Alumni

Dr. U P Rajeev
Outstanding Scientist,
Director, ATSP,
VSSC Trivandrum

Ms. Sheela DS
CEO, Spacelabs Analytics and Dynamics Pvt. Ltd
(Senior Scientist – VSSC -Retd)

Dr. Santhosh Kurup
Professor of Practice,
Digital University Kerala and
CEO ICT Academy of Kerala
(Centre Head, TCS Kochi-Retd)

Mr. Pradeepkumar Keloth
Advisor, L&T EduTech, Chennai
(Head of Engineering,
Robert Bosch-Retd)

Mr. Muraleedharan C. V.
Scientist 'G' (Senior Grade)
Sree Chitra Tirunal Institute
for Medical Sciences and
Technology, Trivandrum

Mr. Praveen Kumar Govindu
Principal HIL Development
Engineer
Changan UK, R&D Centre
Limited

Department of Electrical Engineering
National Institute of Technology Calicut

M.Tech - INSTRUMENTATION & CONTROL SYSTEMS

INTRODUCTION

The postgraduate programme in Instrumentation & Control Systems is a flagship programme of the Department of Electrical Engineering, started in the early 1970's. The ICS stream host research in the areas of control theory, instrumentation, biomedical engineering, rehabilitation, robotics, while rendering guidance for the research in machines & drives, power systems, and industrial automation. Well-established research laboratories are equipped with research software coupled with dedicated computational facilities. The department offers excellent placement and Internship opportunities for MTech and Ph.D. Students. The stream has collaboration with the University of Texas and Oregon State University, USA for interdisciplinary research.

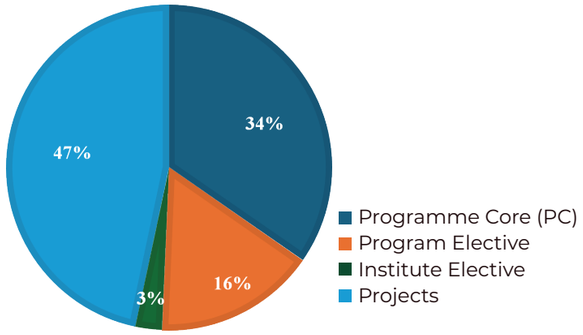
Program Educational Objectives (PEOs)

1. Apply enhanced knowledge and skills in the areas of control systems and instrumentation so as to excel in various sectors in modern industry/utility and/ or teaching and/or higher education and / or research.
2. Engage in design of novel products and strategic solutions to real life problems in the areas of control systems and instrumentation that are technically sound, economically feasible and socially acceptable.
3. Exhibit professionalism, keep up ethics in profession and demonstrate communication skills, leadership qualities as well as willingness to work in groups.

Programme Outcomes (POs)

1. Ability to independently carry out research /investigation and development work to solve practical problems
2. Ability to write and present a substantial technical report/document
3. Ability to demonstrate a degree of mastery over the area as per the specialization of the program. The mastery should be at a level higher than the requirements in the appropriate bachelor program
4. Ability to utilize the acquired knowledge to take up administrative challenges including the management of projects in the field of control systems and instrumentation having multidisciplinary nature with a perspective to maintain lifelong learning process.
5. Willingness and ability to upkeep professional ethics and social values while carrying out the responsibilities as a control system/ instrumentation engineer/researcher in devising solutions to real life engineering problems in an independent manner

Course Structure:



Main Facilities

Control Systems Lab, Advanced Control Systems Lab, Instrumentation Systems Lab, Biomedical Signal Processing Laboratory, Robotics and Control Lab

- 3DOF Helicopter
- Twin Rotor MIMO Systems
- ELVIS II Data Acquisition Systems
- Coupled Tank Systems
- 6DOF Robot
- MAGLEV System
- Haptic Robotic Systems
- Fire Bird Wheeled Mobile Robots
- Electromechanical Transducer Kit
- Comprehensive Rotary Servo Plant
- AC and DC Modular Servo Control Systems
- Air Stream Temperature Control System
- Comprehensive Rotory Servo Plant
- Viper X300 Robot Arm
- Research Air Vehicle RTF Combo

PATENTS

1. Fruit Harvesting Inch Worm Robot. Indian Patent. Approved. Dr. Deepa S N.
2. A controlling system of swivelling headlamp and method of operating the same. Indian Patent. Approved. Dr. Mithun M. S.
3. A universal multi-functional plug and play headlamp system for automobiles
Indian Patent. Dr. Mithun M.S

RESEARCH AREAS

- Nonlinear Control
- Intelligent Control
- Adaptive Control
- Multiagent Systems and Robotics
- Signal Processing for Biomedical Applications
- Cyber-Physical Systems
- Measurement and Instrumentation
- Nonlinear State Estimation
- Aerospace and Underwater Target Tracking
- Control of Aerospace Systems and UAV's
- Machine Learning and Deep Learning
- Instrumentation for Medical, Industrial and Automotive Systems
- Parameter Optimization of Controller Models
- Development of Control Algorithms for Uncertain Physical Systems
- Optimal Control System Analysis & Design
- Smart and IoT based Sensor System Design

PROJECTS

1. Investigations on the alteration in brain dynamics during progression of Alzheimer Disease (AD) from Mild Cognitive Impairment (MCI) under resting and cognitive task conditions using complex network analysis (DST-SERB) for Rs. 18.96 Lakhs: Dr. Subha D.P.
2. An IoT and Analytics Based Framework of Landslide Forecast and Risk Communication for Himalayan Region of North-East India (MeitY, Microelectronics Development) for Rs. 80 Lakhs: Dr. S. N. Deepa
3. Steering controlled adaptive headlights system (NITI Aayog) for Rs. 0.9 Lakhs: Dr. Mithun M S
4. Real Time Traffic Management Leveraging Machine Learning Driven Unmanned Aerial Vehicle Solution (CEFIPRA) for Rs. 150 Lakhs: Dr. Shihabudheen K V
5. Autonomous measurement and tracking of deep-sea plumes using a swarm of heterogeneous underwater vehicles (Ministry of Earth Science's Deep Ocean Mission (DOM)) for Rs. 88 lakhs: Dr. Rakesh R. Warier
6. Networked Marine Robotic Systems for Ocean Exploration (SPARC) for Rs. 84 lakhs: Dr. Rakesh R. Warier
7. Design and development of a highly efficient Microfluidic pumping and mixing device for accurate biochemical analysis with deep learning method (DST-SERB) for Rs. 32.56 Lakhs: Dr. Sathiya S
8. Anomaly Detection and Counter Measures in Cyber-Physical Systems using Advanced Control & Estimation Techniques (DST- SERB-SRG) for Rs. 13.77 Lakhs: Dr. Ranjith Ravindranathan Nair
9. Development of Advanced Non-linear Non-Gaussian State Estimators with Application to Real-life Problems (CRG-SERB) for Rs. 22 lakhs: Dr. Rahul Radhakrishnan
10. Development of Spray Evaporation Technique for the Preparation of Uniform Microparticles of Ammonium Dinitramide (ADN) and Surface Modification by Atomized Spray Coating Method (DRDO) for Rs. 72.59 Lakhs: Dr. Mija S J
11. USBL Tracking and Passive Localization of Targets using Correntropy and Moving Horizon Estimates (NPOL Cochin) for Rs. 12.76 Lakhs: Dr. Rahul Radhakrishnan

PLACEMENTS