



PLACEMENT BROCHURE

2021-22



**DEPARTMENT OF
INSTRUMENTATION**
CUSAT

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VISION

Shaping a better future for mankind by developing effective and socially responsible individuals as well as organizations and to develop competent Engineers with entrepreneurial skills to address socio-economic needs.

MISSION

- ◆ Committed to impart excellent technical education to the students to create techno excellent citizens who will be retaining rich cultural identity to the full satisfaction of our society at large with further commitment to serve the nation.
- ◆ To prepare students of Instrumentation Engineering for a successful career in the process industry that meets the needs of national and multinational companies.
- ◆ To provide training to solve problems relevant to general practice of Instrumentation and Control Engineering and system design.



Cochin University of Science And Technology

Cochin University of Science And Technology (CUSAT) is ranked amongst the top universities in the world by the Times Higher Education (THE), the only university from Kerala to make it to the list. The university was established as the University of Cochin and later reorganized as Cochin University of Science And Technology (CUSAT) in February 1986. The university has been accredited with an A grade by National Assessment and Accreditation Council (NAAC) in 2016 and NIRF Rank 65.

Cochin University of Science And Technology, in its attempt to explore the unknown horizons of knowledge, devotes itself to education and research and focuses on the development of higher learning in science, technology, social-science and other related areas.

Courses offered by the university spread across various disciplines of engineering, environmental sciences, humanities, law, marine sciences, medical sciences, social-sciences, technology etc.

CUSAT transcends geographic boundaries through successful collaborations with institutions in USA, Europe, Russia, Japan, France and Korea. The university is defined by the motto from Vedas "tejasvi navadhithamasthu" which means 'may the wisdom accrued deify us both the teacher and the taught and percolate to the universe in its totality'.



UPLIFTING ENGINEERS TO FACELIFT THE INDUSTRY

DEPARTMENT OF INSTRUMENTATION

The Department of Instrumentation, originally the university science instrumentation centre (USIC) has its origin in 1978 as a service department with the support of the UGC. It has been extending instrumentation support to science and technology departments of the university. The center was elevated to a level III USIC by UGC in 1990. With this the centre became a full –fledged academic department. The department started a post graduate diploma course in instrumentation in 1994. In 1995 the university re organized USIC into a full-fledged teaching department with USIC contained in it and the department came into existence in its present form. The Department of Instrumentation offers an impressive suit of programs for students seeking management expertise.

- Four year B.Tech Program (Full Time)
- Research Program (Full Time)
- Two year M.Sc Program (Full Time)
- Two year M.Tech Program (Full Time)

The programme covers almost all areas of modern instrumentation such as Analytical technique, Process control, PC and Microprocessor based Instrumentation, Optoelectronics, Vacuum and Cryogenics, Robotics as well as Environmental monitoring instruments. The department is associated with Yokogawa Inc, and has also installed a Distributed Control System as part of continuous efforts to keep up with the latest trends in technology. There are similar associations with Libelium, National Instruments and many more companies as well.

The department has a very active research programme in the area of instrumentation and applied physics. The department has implemented a number of research projects funded by DST,DAE,UGC,AICTE,KSCSTE,etc. It has been a venue for a number of national symposia. The department has published a number of research papers pertaining to instrumentation and allied areas.





Dr . Johney Isaac
Head of Department



I am glad to introduce a very competent and enthusiastic batch of students of B.tech Instrumentation course from our department to the corporate world. Our B.tech program in instrumentation covers all major areas of Instrumentation, Life sensors, Transducers, Process control, Microprocessor, Micro - controllers and Signal processing etc. The course is structured to meet the requirements of the higher studies in Instrumentation, Electronics, Computer- based system development etc.

We conduct M.Tech and M.Sc in Instrumentation with an intake of twenty-six as well as sixteen students respectively. We have a very active research program with around thirty-three PhD students at present. The main area of research in the department are photoacoustics, Microwaves, the stipulation of neural networks, nanofluids, graphene etc. Our students from earlier batches have been well received in the industry and in leading academic institutions. I am sure that the present batch of students will be able to keep up the tradition. I wish them all the best.



FACILITIES

The department is particularly well known for its strength in research fields and undertakes R&D works on various aspects of Instrumentation and Applied Physics. These facilities includes a variety of measuring instruments such as photoacoustic spectrometer, ultrasonic interferometer, conductivity measuring setup, temperature controllers etc. Most of these facilities have been set up with the support received from various central funding agencies and also carries active consultancy services for agencies like DST, DAE, UCiC, AICTE, STED, AND TWAS. The department also carries active consultancy services for agencies like LXT Ltd, PHDS-CPL etc.

ANALOG & DIGITAL ELECTRONICS LAB

The lab is occupied with various training kits to explore the practical aspects of topics from subjects like Electronic devices & circuits, analog & digital electronics.

At the same time, students are encouraged to prepare the complete circuit on a breadboard and verify the results with the results obtained from training kits.



COMPUTER LAB

The facilities are utilized for the conductance of the basic programming courses ,data structure, and algorithm development, etc. Students get the best computer setup along with software packages like MATLAB, PSpice, LabVIEW, etc.





ELECTRICAL MACHINES LAB

Various equipment like step-down & isolation transformers, DC motors, 1-phase induction motors, generators etc are available for performing tests related to specific machines.

MATERIAL SCIENCE & TESTING LAB

Knowledge of material properties of different materials is a must to select appropriate materials for different applications. To serve these objectives, Material Science & Testing Lab is used.



MICROPROCESSOR & CONTROLLER LAB

This lab has various system development board come trainer kits to understand different microprocessors and controllers. There are advanced trainer kit for various processors to study.

FACILITIES



TRANSDUCER LAB

This lab helps to explore the usage and applications of transducers for measuring temperature, force, displacement, etc. It is well equipped with a strain gauge load-cell trainer kit, LVDT trainer, thermistor trainer, thermocouple, RTD trainer, etc.

PROCESS CONTROL LAB

This lab deals with studies and determination of time-constants of first and second-order processes, dynamics of vessels, pressure, and temperature variation under interacting and non-interacting systems, apart from level and flow controls such as proportional, Proportional-Integral as well as proportional-Integral-Derivative controllers and control valves are available



LIBRARY AND INTERNET

The library contains a large collection of books and is a regular subscriber of many national and international journals like a review of scientific instruments, the Instrument Society of India, etc. It also has a good collection of project reports and research papers. High-speed Wi-Fi facilities are available throughout the department for students, giving them ample scope to learn and enlarge their vision.



RESEARCH FACILITIES

The Department of Instrumentation extends instrumentation services to various Science and Technology Departments of the University through various works such as design and fabrication of experimental gadgets, electronic design and fabrication, glass blowing, carpentry work, and allied services. The Department also carries out consultancy work for other academic institutions, Research & Development organizations, and industries as well. It also has advanced sensing and analytical systems including CVD facility, WSN, Impedance Analysers, FBG sensors, etc to accelerate its research outcome.

Prominent Research Areas

- ◆ Nano Composites
- ◆ Ultrasonic
- ◆ Microwave Plasma ALD Facility
- ◆ PC based Instrumentation
- ◆ Signal Processing employing Neural Network

CVD AND ALD LABS

Research lab equipped with Microwave plasma-assisted Atomic Layer Deposition unit for the synthesis of high-k dielectric materials and Chemical vapor deposition unit for 2-D graphene fabrication.



SPUTTERING LAB

RF Magnetron sputtering is used to produce thin, uniform and pure films of various materials/targets like metals (Platinum, Gold, Silver, Chromium, Aluminium etc.) and Semiconductors/Dielectrics like silicon, Titanium dioxide, silicon dioxide, zinc oxide, Aluminium oxide etc. Magnetron sputtering has the advantage of producing thin films with controlled properties with high adhesion. These thin films applications in optics, electronics, aerospace etc





IOT LAB BASED INDUSTRY STANDARD LIBELIUM PRODUCTS

Libelium provides an advanced smart sensor system, which has been widely accepted for various applications such as Smart city, smart agriculture, smart water, smart environmental monitoring etc.

FBG INTERROGATORS

FBG Interrogators are high-precision measuring instruments for signal obtaining and processing from FBG sensors under operating conditions. The device is controlled by the PC with the specialized software for sensors monitoring. The system contains a broadband source of radiation and it can carry out spectrum analysis.

An interrogator can measure a large sensing network composed by various types of sensors (such as strain, temperature, displacement, acceleration, tilt, etc) connected along multiple fibres, by acquiring data simultaneously and at different sampling rates.



SEMESTER 01

- ♦ Applied Mathematics I
- ♦ Engineering Physics
- ♦ Engineering Chemistry
- ♦ Basic Electronics
- ♦ Electrical Engineering I
- ♦ Technical Communication

SEMESTER 02

- ♦ Applied Mathematics II
- ♦ Analog Electronics
- ♦ Engineering Mechanics
- ♦ Electrical Engineering II
- ♦ Material Science
- ♦ Ecology and Environmental science

SEMESTER 03

- ♦ Applied Mathematics II
- ♦ Digital Electronics
- ♦ Linear Integrated Circuits
- ♦ Electronic and Electrical Instruments
- ♦ Mechanical Engineering
- ♦ Semester Viva-Voce (Internal)

SEMESTER 04

- ♦ Applied Mathematics IV
- ♦ Principles of Measurements
- ♦ Control Engineering I
- ♦ Power Electronics
- ♦ Pneumatic and Hydraulic Systems
- ♦ Semester Viva-Voce (Internal)



SEMESTER 05

- ♦ Control Engineering II
- ♦ Transducers and Industrial Instrumentation I
- ♦ Micro Processors and Applications
- ♦ Analytical Instruments
- ♦ Digital Instruments
- ♦ Semester Viva-Voce (Internal)

SEMESTER 06

- ♦ Transducers and Industrial Instrumentation II
- ♦ Signals and Systems
- ♦ Process Control
- ♦ Opto-electronics
- ♦ Engineering Management
- ♦ Semester Viva-Voce (Internal)

SEMESTER 07

- ♦ Biomedical Instrumentation
- ♦ Process Control II
- ♦ Power Plant Instrumentation
- ♦ Telemetry and Remote Control
- ♦ Digital Signal Processing
- ♦ Semester Viva-Voce (Internal)
- ♦ Mini Project
- ♦ Seminar

SEMESTER 08

- ♦ Microcontrollers and Computer-based Instrumentation
- ♦ Vacuum and Cryogenic Instrumentation
- ♦ Elective II
- ♦ Main Project
- ♦ Comprehensive Viva Voce

ELECTIVES

- ♦ Digital Signal Processing
- ♦ Nonlinear Control Systems
- ♦ Environment Monitoring Instruments
- ♦ Adaptive Control and Learning Systems
- ♦ Process Dynamics
- ♦ Advanced Analytical Techniques
- ♦ Advanced Biomedical Instrumentation
- ♦ Robotics and Expert System



SEMESTER 01

- ♦ Intelligent Techniques in Instrumentation
- ♦ Advanced Sensor Technology
- ♦ Adaptive and Robust Control
- ♦ Elective 1
- ♦ Elective 2
- ♦ Sensor Technology Lab
- ♦ Control System and Computing Lab

SEMESTER 02

- ♦ Multi Sensor Data Fusion
- ♦ PC Based Instrumentation
- ♦ Seminar
- ♦ Elective 3
- ♦ Elective 4
- ♦ Elective 5
- ♦ Soft Computing Lab
- ♦ Advanced Process Control

SEMESTER 03

- ♦ Project Progress Evaluation

SEMESTER 04

- ♦ Project Dissertation Evaluation

ELECTIVES

- ♦ Digital Image Processing
- ♦ Mechatronics
- ♦ MEMS and Microsystems
- ♦ Wireless Sensor Networks
- ♦ Optoelectronics and Instrumentation
- ♦ Non-Destructive Testing and Analysis
- ♦ Navigation Guidance and Control
- ♦ Embedded System Design
- ♦ Remote Sensing and Geographical Information Systems
- ♦ Internet of Things



SEMESTER 01

- ♦ Applied Mathematics
- ♦ Introduction to Instrumentation
- ♦ Systems Sensors
- ♦ Transducers and Actuators
- ♦ Electronic Devices and Circuits
- ♦ Digital Electronics
- ♦ Computer Science Lab
- ♦ Analog Sensors Lab

SEMESTER 02

- ♦ Microprocessors and Instrumentation
- ♦ Optical Instrumentation
- ♦ Biomedical Instrumentation
- ♦ MEMS and Microsystems
- ♦ Sensors and Signal Conditioning Lab
- ♦ Digital Electronics Lab

SEMESTER 03

- ♦ Signal Processing
- ♦ Analytical Methods and Instrumentation
- ♦ Vacuum Techniques and Instrumentation
- ♦ Process Control
- ♦ Microcontroller and Computer based Instrumentation
- ♦ Seminar
- ♦ Control Systems and Process Control Lab
- ♦ Microprocessor and Interfacing Lab

SEMESTER 04

- ♦ Project Dissertation Evaluation

ELECTIVES

- ♦ Material Science
- ♦ Vacuum Techniques and Instrumentation
- ♦ Biomedical Instrumentation
- ♦ MEMS and Microsystems
- ♦ Modern Control System
- ♦ Process Control
- ♦ Microcontroller and Computer Based Instrumentation





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STIC

Sophisticated Test and Instrumentation Center is an institution sponsored jointly by Cochin University of Science and Technology (CUSAT) and Kerala State Council for Science Technology and Environment (KSCSTE). It is an institution to assist the industries, R&D organisations and Higher Education Centers by providing highly sophisticated testing and calibration facilities, material analysis facility, R&D support, consultancy services and training programs.

This institution provides great opportunity to Instrumentation students. The Calibration Laboratories of STIC are equipped with modern calibration instruments and standards that are traceable to National Standards. These laboratories are accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL).

STIC offers calibration services for Electro-Technical, Thermal and Mechanical parameters. STIC takes up R&D projects in the field of Instrument Development and other support R&D work for Industries and Research Institutions. STIC also conducts occasional Training Programs/Seminars/Workshops in the areas of Instrumentation, Calibration, Analysis, Quality Management etc. Some of the instruments in the STIC are Electron Microscopy (Scanning EM/Transmission EM/EDAX), X-Ray Diffraction (Powder XRD/ Single Crystal XRD), ICP - Mass spectrometer, CHNS Analyzer, Nuclear Magnetic Resonance FT NMR Spectrometer, MALDI-TOF mass spectrometer, Thermal Analysis TGA-DTA, Thermal Analysis DSC, Ultra Microtome, Ultra Pure Water system.





TeQuest

In 1999, for the first time, a unique event was organized by Department of Instrumentation, CUSAT with an aim to bridge the gap between academics and industry. Then it was called TechnoQuest, later it was rechristened TeQuest. It was a huge success, with an unexpected acceptance and level of participation by students and industries from and around South India.

Holding true to our initial goal of bridging the gap between academics and industry in even stronger terms, we continue this long process with TeQuest. Most notably, TeQuest'18, TeQuest'19, TechnoQuest'99, TechnoQuest'02, and the National Symposiums of 2005 and 2007 saw participation in unprecedented numbers. The result of this was a technical consultancy cell formed by students of Instrumentation which catered and solved industrial problems.

It's set to elicit participation from students and industries from all over India. TeQuest being a techno-cultural fest, expect a fruitful exchange of knowledge as well as an unforgettable cultural experience.





OUR INDUSTRIAL COLLABORATIONS

Rotork India, Chennai
 Bosch, Bangalore
 Yokogawa, Bangalore
 Wika Instruments, Pune
 ISRO, Trivandrum
 Hindustan Organic Chemicals Limited, Cochin
 BPCL, Cochin





Departmental Activities

Department of Instrumentation is organizing various programmes like national seminar on Advances in Scientific & Industrial Instrumentation (ASCI), with the support from UGC, New Delhi. Erudite Programme (Scholar In Residence) with the financial support from Govt. of Kerala. Celebrating Kalam, A competition for school students called "Celebrating Kalam" in memory of our former president.

Academic Activities

Department arranges industrial visits & training for the student community to help them to identify the different job profiles and to get closer with the working environment of industry. The various industries include NTPC Kayamkulam, FACT Kochi, FCRI Palakkad etc.

Student Activities

The department is organizing various activities like tech fest fresher's day, onam fest and games, info sports, info literary events, teachers day celebration, debates, personality development programmes, group discussions, cleanliness and tree planting drive, alumini meet, new year celebration etc. In addition to the above activities, our students are actively participating in CUSAT Youth Festival as well as in CUSAT Sports.

PLACEMENT CELL

The Department of Instrumentation has a vibrant and lively functioning placement cell that strives to find you the right organization. The placement cell carries out counselling and training to ensure students are mentally and emotionally prepared to face an interview board. Interactive talks with experts are also held along with this. Besides, the cell maintains a healthy relationship with our alumni and other top officials to enhance the scope of employment.

PLACEMENT TEAM

Placement Coordinator

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Student Placement Coordinator

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Contact Us

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