

KAKATIYA INSTITUTE OF TECHNOLOGY & SCIENCE

Warangal – 506 015, Telangana, INDIA (An AUTONOMOUS INSTITUTE under Kakatiya University, Warangal)

కాకతీయ సాంకేతిక విజ్ఞాన శాస్త్ర విద్యాలయం, వరంగల్ – 506 015.

Department of Electronics and Communications

**HEARTY WELCOME
TO
NAAC PEER TEAM**

Research & Education Center

Advanced Communications



About the Research and Education Center

- Our research at Electronics and Communication Engineering discipline brings together the academic and industrial talents from across a range of extents that includes Communication, Signal Processing, VLSI and Embedded Systems.
- Our culture of innovation, strong industrial collaboration and outstanding facilities will help you achieve your research ambitions.
- The Signal Processing Lab within our academic and research centre serves as a hub for hands-on exploration and experimentation in the field of signal processing.
- Equipped with state-of-the-art technology and software, the lab facilitates both academic learning and advanced research endeavours. Below are the comprehensive notes detailing the resources and capabilities available.



Primary functions of the centre

- Qualified and experienced academia from top national and international institutes having strong research acumen
- Research staff with experience in real time industrial applications
- State-of-art and fully equipped laboratories
- Highly advanced industrial graded computing facilities with latest simulation software
- National and International research collaborations with reputed Universities
- Mentoring from reputed industry researchers



Major Facilities Available

HARD WARE

Personal Computers (PCs):

The lab boasts a total of 30 personal computers, each equipped with robust hardware configurations to support computational-intensive tasks and simulations.

MATLAB Software:

A cornerstone of signal processing research, the lab is furnished with licensed MATLAB software, providing students and researchers with a versatile platform for algorithm development, data analysis, and visualization.

CC Studio Software:

Complementing MATLAB, the lab features CC Studio software, tailored specifically for digital signal processing (DSP) applications. This toolset enhances the learning experience by enabling students to delve into real-time signal processing tasks and algorithm implementation on



Major Facilities

TMS320C6748 Kits:

Central to practical experimentation, the lab is outfitted with TMS320C6748 kits, empowering users to explore DSP concepts through hands-on projects and prototyping. These kits offer a rich set of features and peripherals, facilitating seamless integration with various interfacing devices for signal acquisition, processing, and output.

Interfacing Devices:

Supporting the TMS320C6748 kits, the lab houses a diverse array of interfacing devices such as sensors, actuators, and communication modules. These devices enable students and researchers to interface real-world signals with the digital domain, bridging theory with practical applications



Projects To be Carried out

Graduate Projects:

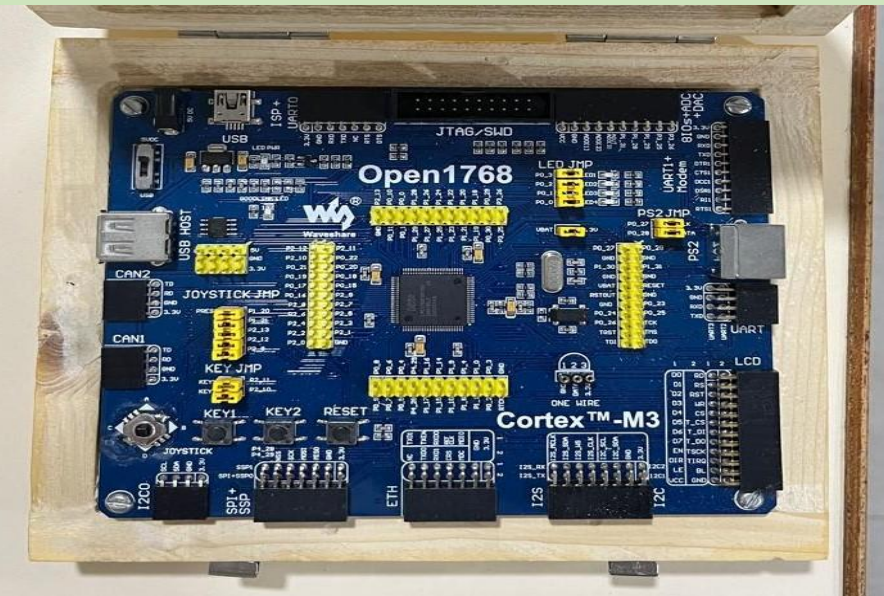
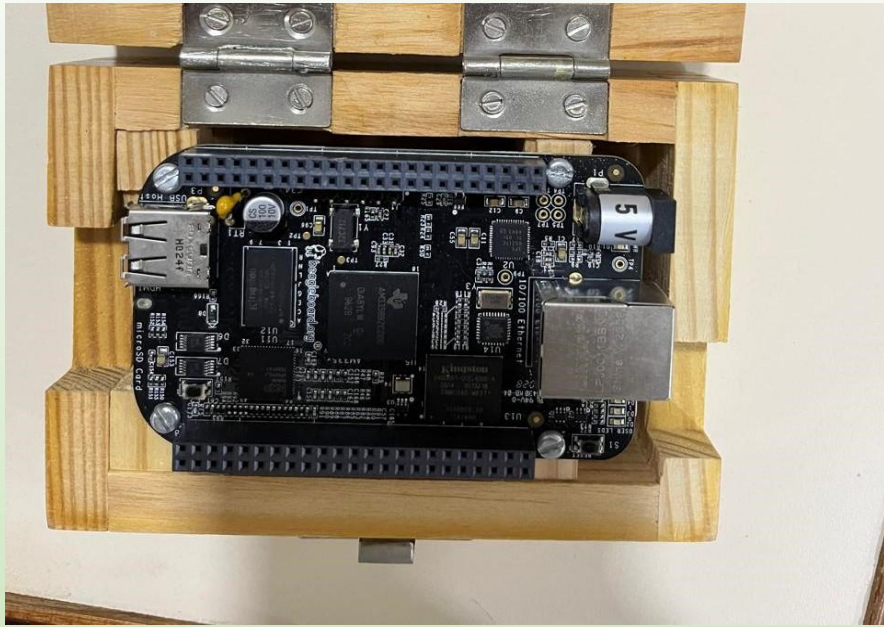
- 1. Real-Time Audio Equalizer Implementation:** Students can design and implement a real-time audio equalizer using digital signal processing techniques. This project involves analysing audio signals, applying various filter designs (such as FIR or IIR filters), and implementing the equalizer algorithm on the TMS320C6748 kits. The project aims to enhance students' understanding of filter design and real-time signal processing.
- 2. Wireless Sensor Network for Environmental Monitoring:** In this project, students develop a wireless sensor network (WSN) for environmental monitoring using interfacing devices and communication modules available in the lab. They design sensor nodes to measure parameters such as temperature, humidity, and air quality, and establish communication protocols for data transmission to a central processing unit. The project explores concepts of sensor interfacing, data fusion, and wireless communication.
- 3. Biomedical Signal Processing for Health Monitoring:** Students delve into biomedical signal processing by designing algorithms for health monitoring applications. They acquire physiological signals (such as ECG or EEG) using interfacing devices and analyse the signals to detect anomalies or patterns indicative of specific health conditions. This project emphasizes signal processing techniques tailored for biomedical applications, fostering an understanding of signal acquisition and analysis in healthcare.



Projects To be Carried out

Postgraduate Research:

- 1. Machine Learning-Based Signal Classification:** Postgraduate researchers focus on developing machine learning algorithms for signal classification tasks. They explore techniques such as supervised learning (e.g., support vector machines, neural networks) to classify signals into different categories or classes. The research involves feature extraction, model training, and performance evaluation using datasets available in the lab or collected through experiments.
- 2. Sparse Signal Reconstruction Techniques:** Researchers investigate sparse signal reconstruction techniques for applications such as compressed sensing and sparse representation. They develop algorithms to efficiently recover signals from under sampled measurements, leveraging techniques like l_1 -norm minimization and greedy algorithms. The research contributes to advancing signal processing methods for sparse signal recovery in scenarios with limited sensing resources.
- 3. Image and Video Processing for Computer Vision:** Postgraduate research in image and video processing focuses on applications in computer vision. Researchers explore algorithms for tasks such as image enhancement, object detection, and video tracking. They develop novel approaches to address challenges such as noise reduction, illumination variations, and occlusions, aiming to improve the performance of computer vision systems in real-world environments.





THANK YOU