



**VIGNAN'S**  
Foundation for Science, Technology & Research  
(Deemed to be UNIVERSITY)  
-Estd. u/s 3 of UGC Act 1956



**KEYSIGHT**  
TECHNOLOGIES

**VIGNAN - KEYSIGHT**

**Centre of Excellence**  
**Advanced RF, Microwave and**  
**Wireless Communications**  
**(ARMWC)**

Department of Electronics & Communication Engineering  
VFSTR (Deemed to be UNIVERSITY)



## Introduction

Vignan is one of the pioneering institute near the capital region of newly formed Andhra Pradesh and the department of Electronics and Communication Engineering has made its own reputation in this region for its strong academics and research. By keeping its lead in the region, VFSTR has established a Centre of Excellence in Advanced RF, Microwaves and Wireless Communications with World Class infrastructure for the researchers of this region in the year 2017. The CoE has been established with worth of Rs. 12 Crore investment as a joint collaboration between VFSTR and Keysight Technologies, USA.

## Objectives of CoE

The main objective of this facility is setting up Advanced Communications System Design and Test house which caters the needs of PG and Research students. But also can be leveraged to support UG lab courses, minor and major projects. It also provides the facility for Real World System, Circuit and Antenna design activities, Real time Communication System Measurements and debugging capabilities for consultancy service to various industries. It provides Design and Test House capability in the RF, Microwave and Wireless Communication systems in Aerospace, Defense, Cellular, Automotive, Satellite, Home Appliances, Biomedical sectors with the following components:

## Communication Systems Design and Test Lab

- Communications - System Level Design and Testing
- Algorithm Design and Testing
- Wireless Communication Standards
- RADAR System Design
- Software Defined Radio (SDR), Cognitive Radio System Design
- Custom OFDM System Design
- MIMO System Design and Algorithm Development and more...

## RF Component, Circuit Design and Test Lab

- RF Transmitter and Receiver Designs
- RF Component Designs e.g. Filters, Couplers, Power Divider, LNA, Amplifier etc
- MMIC Circuit Designs

## Antenna Design, Fabrication and Testing Lab

- Patch
- Patch Array
- Horn Antennas
- MIMO Antennas
- DRA Antennas
- CPW Antennas and more...

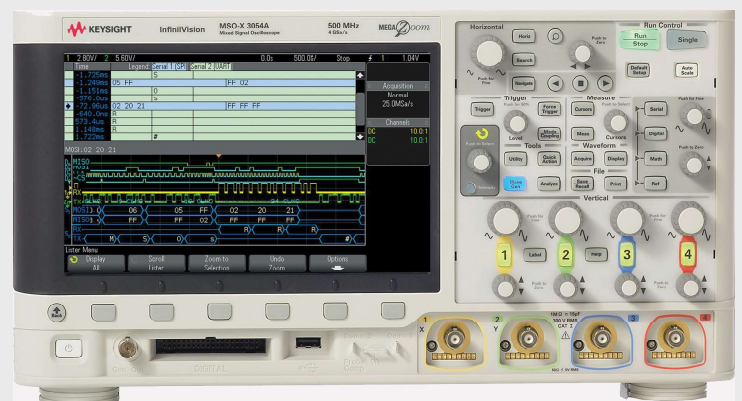


“This is prestigious lab for VFSTR which consists of state of art equipment for advanced wireless research. We are thankful to KEYSIGHT Technologies, USA which is one of the member of Agilent Technologies”.

“Keysight Technologies is pleased to be associated with a prestigious institute like VFSTR (Deemed to be University), Guntur in recommending relevant topics for their PG program and provide test equipments and design tools and act as an enabler to connect them with industry” said V.V. Pathy, Head Business Development at Keysight Technologies.

## CoE Facilities

S. No	Description
1	<b>VECTOR SIGNAL GENERATOR</b> Keysight N5182B-506 RF Vector Signal Generator, 9 kHz to 6 GHz
2	<b>VECTOR SIGNAL ANALYZER</b> Keysight N9010B-526 X-Series Signal Analyzer, Frequency range, 9KHz to 26.5GHz
3	<b>MIXED SIGNAL OSCILLOSCOPE</b> Keysight MSOX4104A : Bandwidth-1GHz, 4 Analog and 16 digital channels with 12.1-inch display, capacitive touch screen technology, with <b>built-in dual channel 20MHz Arb/Function generator and includes MSOX4000-BDL</b>
4	Keysight 16862A Standalone Logic Analyzer, 68 Channel with 4GHz timing with standard 1M acquisition memory, acquisition memory depth to 4M
5	Keysight 33612A : Arbitrary Waveform generator : 80MHz, 2-Channel
6	Keysight RFMIC Kit
7	Keysight E5063A-2D5 ENA Series Network Analyzer, 2-Port S- Parameter test set, 100 kHz to 14GHz, 50 $\Omega$ system impedance.
7a	Keysight 85054D Economy Mechanical Calibration Kit, DC to 18 GHz, Type-N, 50 $\Omega$
8	Keysight N1911A : P-Series Single Channel Power Meter : 30 MHz Video Bandwidth, Single shot real time capture at 100 Msamples/second.
8a	Keysight E9327A : E-Series Peak and Average Power Sensor : 50 MHz to 18 GHz, -60 dBm to +20 dBm Power range in Average Mode.
9.	MITS PCB / Antenna Prototyping Machine
<b>SOFTWARE</b>	
1	Keysight SystemVue Software Univeristy License bundle, 5 Users for 99 years term
2	Keysight ADS (Advanced Design System) + Empro Software University License bundle, 5 Users for 99 years term
3	Keysight 89600B-EDU15 : Vector Siganal Analysis Software University License bundle, 5 Users for 99 years term.
4	Anslys Acadmic Teaching HF Package Ansoft Designer (RF and SI), HFSS, SLWAVE, Q3 Extractor, Optimetrics, ECAD and MCAD Translators, 25 Users



“ARMWC CoE is an academia-industry collaboration in the field of wireless communications”



## Research Thrust areas of the CoE

S No	Research Area	Industries Getting Benefitted
1	Wideband Waveform Generation for Radar Applications	Aerospace, Defense
2	New waveform design for 5G cellular communications	Cellular
3	Design of Energy Harvesting Antennas	Aerospace, Defense, Cellular
4	Investigating several fractal geometries for realizing small and multi-frequency antennas	Aerospace, Defense, Home appliances, Wireless Communications
5	Developing wideband microstrip patch antennas for circular polarization, and improved radiation characteristics for wide band applications	Satellite, Cellular, Wireless Communications
6	Sophisticated RF and microwave modeling capabilities for the analysis, design and characterization	Aerospace, Defense, Home appliances, Wireless Communications
7	Developing antennas for several industrial/commercial applications	Aerospace, Defense, Home appliances, Wireless Communications, Healthcare etc.,
8	Bio-medical signal Processing	Health care
9	Software Defined Radio (SDR)	Aerospace, Defense, Home appliances, Wireless Communications, Healthcare etc.,
10	Internet of Things (IoT)	Home appliances, Healthcare, Automobile, Smart Cities

## Areas of the Consultancy

- Designing Antenna systems for 3D tracking systems
- Tracking and control of unmanned aerial surveillance systems like drones
- Development and Implementation of Collision-Avoidance Algorithms
- Sensor-Arrays and its H/W Integration for UAV(Unmanned-Aerial Vehicle)
- Physical Layer design and test for the communication systems of Aerospace, Defense, Cellular, Automotive, Satellite domains
- Baseband and RF component design and Testing
- Antennas Design & Validation
- Academic Training courses - HFSS, ADS, System Vue, RF Component & Antenna Design

## Technologies Covered

- 5G New Radio
- Automotive Radar
- Narrowband IoT
- UAV Tracking Radar
- WLAN / BT / ZigBee / RF ID / WiMax / LTE
- MIMO
- SDR, Cognitive Radio
- OFDM
- GSM/GPRS/EGPRS
- WCDMA/HSDPA/HSUPA/HSPA+
- Satellite Communication

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