

6. Research Thrust Areas of the CoE

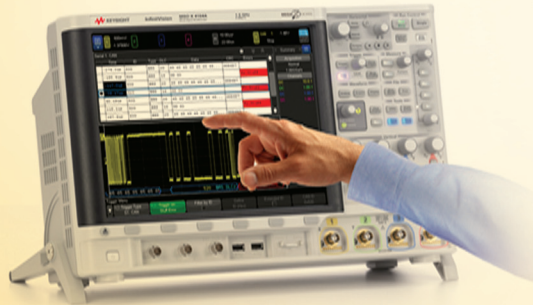
SI No	Research Area	Industries getting benefitted
1	Wideband Waveform Generation for Radar Applications	Aerospace, Defence
2	New waveform design for 5G cellular communications	Cellular
3	Design of Energy Harvesting Antennas	Aerospace, Defence, Cellular
4	Investigating several fractal geometries for realizing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

7. Offering the following Services

- Physical Layer design and test
- Baseband and RF
- Design Validation
- Test as per Standards
- Joint Research Programs

8. Technologies Covered

- GSM/GPRS/EGPRS
- WCDMA/HSDPA/HSUPA/HSPA+
- AMPS/IS95A-B/IS2000/EVDOA-B
- WLAN/BT/ZigBee/RF ID/WiMax/LTE
- MIMO
- SDR, Cognitive Radio
- OFDM



"This is prestigious lab for Vignan University which involves high investment. We are thankful to KEYSIGHT Technologies which is one of the member of Agilent Technologies".

"Agilent Technologies is pleased to be associated with a prestigious institute like Vignan 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 Agilent Technologies.

"This lab paves the way for academia-industry collaboration in the field of wireless communications".



VIGNAN'S- KEYSIGHT CENTRE OF EXCELLENCE

ADVANCED RF, MICROWAVE AND WIRELESS COMMUNICATIONS



DEPARTMENT OF ELECTRONICS AND COMMUNICATIONS ENGINEERING



VIGNAN'S
Foundation for Science, Technology & Research
(Deemed to be University)

NAAC 'A'
Accredited

MHRD
nirf 88
Rank

-Estd. u/s 3 of UGC Act 1956

Vadlamudi Post, Guntur Dt., A.P., INDIA- 522213.
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1. Preface

Wireless technology is one of the fastest growth areas of the last few decades. It offers very attractive area of research and application in a large variety of fields varying from radio broadcast to TV Broadcast, mobile communication to satellite communication, wireless measurement to wireless automation.

VFSTR University is one of the pioneering institutes 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. To keep its lead in the region, there is a need to upgrade the existing facilities of communications lab and create an infrastructure of World Class for the researchers of this region.

2. Objectives of CoE

- Set up Advanced Communications System Engineering Lab for PG, but leverage the equipments for UG
- Provide facility for students to learn Communication System basics
- Open avenues for Advanced Communication Study and Research
- Scalable and upgradeable solution in multiple phases

Provides facility for:

- Real world System, Circuit and Antenna design activities
- Real world Communication System Measurements

3. Vignan-Keysight Advanced RF, Microwave and Wireless Communications and Circuit Design Lab

Design Lab includes three main components

Communication Systems Design Lab

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

RF System and Circuit Design Lab

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

Antenna Design Technology

- Patch
- Patch Array
- Horn Antennas
- MIMO Antennas
- And more....

4. Equipment List and Cost

Sl.No	Description	QTY	Price
1	VECTOR SIGNAL GENERATOR Keysight N5182B-506 RF Vector Signal Generator, 9 kHz to 6 GHz	1	3747788
2	VECTOR SIGNAL ANALYZER, Keysight N9010B-526 X-Series Signal Analyzer, Frequency range, 10 Hz to 26.5GHz	1	33,96,875
3	Mixed Signal Oscilloscope, Keysight MSOX4104A: Bandwidth-1GHz, 4 Analog and 16 digital channels with 12.1-inch display, capacitive touch screen technology, with built-in dual channel 20MHz Arb/Function generator and includes MSOX4000-BDL	1	1,717,358.00
4	Keysight 16862A Standalone Logic Analyzer, 68 Channel with 4GHz timing with standard 1M acquisition memory, acquisition memory depth to 4M	1	1648237
5	Keysight 33612A: Arbitrary Waveform generator: 80MHz, 2-Channel	1	601,733.00
6	Keysight RFMIC Kit	1	145,000.00
7	Keysight E5063A-2D5 ENA Series Network Analyzer, 2-Port S- Parameter test set, 100 kHz to 14GHz, 50 system impedance.	1	2,334,450.00
7a	Keysight 85054D Economy Mechanical Calibration Kit, DC to 18 GHz, Type-N, 50	1	150000
8	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.	1	321860
SOFTWARE			
1	Keysight SystemVue Software: Univeristy License bundle, 5 Users for 99 years term.	5 Users	39,900,000.00
2	Keysight ADS(Advanced Design System) + Empro Software : University License bundle, 5 Users for 99 years term.	5 Users	39,900,000.00
3	Keysight 89600B-EDU15: Vector Siganal Analysis Software University License bundle, 5 Users for 99 years term.	15 Users	15,458,469.00
Total Cost(Including Tax)			110,470,342.00
Keysight University Grant			96,993,396.00
Vignan University Contribution			13,476,946.00

5. Outcomes of the CoE

By upgrading the communication labs to the research level has the following benefits in the next 3 to 5 years time line

Supports UG and PG Labs

- Analogue and Digital Communication Lab
- Signals and Systems Lab
- Microwave and Radar Lab
- Advanced Communications Lab
- RF/Wireless Measurements Lab

For Research Scholars

- Advanced Wireless Communication Systems research Lab
- Advanced RF Communication Systems research Lab
- Advanced Microwave and Radar Lab

Introduction of new PG Courses:

- Advanced Communication Systems
- RF and Microwave Engineering

Projects in multiple disciplines of communications and RF Microwaves for DRDO, ISRO, HAL, NAL and other defence, aerospace, communication funding organizations.

For Example projects like

- 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)