Research&Development Cell

About R&D Cell :

This R&D Cell was established on August 18th 2015 at separate room available in EDC Lab-1 with a great support and motivation from Dr. T.Venkateswara Rao, Head Of the Department, ECE and Dr. G.Sambasiva Rao, Principal. This R&D cell intends to develop expertise in students to prepare them for taking up interviews and placements in core sectors of Electronics and Communication Engineering. It will conduct Guest lectures and Workshops with hands-on sessions that will enable students to expertise on industry relevant concepts and skills. Hardware and software resources existing in R&D centre will be utilized for the development of students as well as faculty.

OBJECTIVES:

1. To motivate the students to do In-house projects using latest equipment and technology.
2. To cultivate the transfer of knowledge from senior students to their juniors.
3. To conduct workshops and hands on sessions using internal faculty and outside resource persons.

VISION
To become a centre of excellence in Embedded system and other thrust areas in Electronics and communication Engineering
MISSION
Build Innovative Techniques in the area of agricultural, Medical, Industrial Applications using IOT and Embedded Systems

FACULTY COORDINATORS:

1. Dr. P.H.S.TEJO MURTHY $_{Ph.D}$ Professor, Dept Of ECE

2. Sri. K.LAKSHMI NARAYANA$_{(Ph.D)}$Sr. Asst.Professor, Dept Of ECE

3. Sri. K.MIRANJI $_{M.Tech,MBA}$ Asst.Professor, Dept Of ECE

4. Sri. A.VAMSI KRISHNA$_{M.Tech}$ Asst.Professor, Dept Of ECE

5. Sri. V.RANJITH KUMAR$_{M.Tech}$ Asst.Professor, Dept Of ECE

AVAILABLE EQUIPMENT:

S.NO	NAME OF THE MAJOR EQUIPMENT	QUANTITY
1	NI-ELVIS	3
2	Texas instruments-ASLK kits	3
3	Texas instruments C2000 launch Pads	2

4	Arduino Uno 8 &16 Bit Kits	14
5	IOT NODE MCU kits	6
6	ARM 7- LPC2148 BOARDS	2
7	PCs-Lenovo think center	2

SOFTWARES AVAILABLE:

S.NO	NAME OF THE SOFTWARE	QUANTITY (USERS)
1	ANSYS HFSS	3
2	LABVIEW	3
3	XILINX 13.1	3
4	MATLAB 12.0	3
5	MULTISIM 13.0	3
6	MENTOR GRAPHICS	1

LIST OF COMPO1NENTS AVAILABLE UNDER R&D CELL:

S.NO	NAME OF THE COMPONENT	QUANTITY
1	USB CABLES	14
2	BO MOTORS	13
3	SERVO MOTORS	01
4	PIR SENSORS	07
5	POTENTIO METERS	15
6	MOTOR DRIVERS	05
7	RELAYS	07
8	CRYSTALS	05
9	LM 35	05
10	ULTRASONIC	05
11	BLUETOOTH MODULES	05
12	ACCELROMETERS	04
13	SCREW DRIVERS	05
14	METAL CHASIS	04
15	NODE MCU	12
16	ESP 8266	02
17	IOT PORTING CABLES	12
18	PHOTO TRANSISTORS	15
19	MQ2 SENSORS	05
20	MQ2 PCB BOARDS	05
21	PHOTO RECEIVERS	14
22	LEDS	--
23	PUSH BUTTONS	--
24	LDRs	--
25	RESISTORS	--
26	MALE TO MALE CONNECTORS	--
27	MALE TO FEMALE CONNECTORS	--
28	FEMALE TO FEMALE CONNECTORS	--
29	BATTERIES	--

PROJECTS CARRIED OUT SO FAR UNDER R&D CELL:

S.NO	PROJECT TITLE
1	AGRICULTURAL SOIL TESTING SYTEM
2	WAR FIELD ROBOT
3	BORE WELL CLIMBING ROBOT
4	SMART CAR PARKING SYSTEM
5	IMPLEMENTATION OF HILL CLIMBING ALGORITHM
6	BIOMETRIC BASED ATTENDANCE SYSTEM
7	DESIGN OF COMPACT WING-SHAPE VIVALDI ANTENNAFOR X-BAND APPLICATIONS
8	DESIGN OF A WIDEBAND SEMI-FRACTAL SQUARE PATCH ANTENNA FOR KU-BANDAPPLICATIONS
9	DESIGN AND IMPLEMENTATION OF SMART HOUSE CONTROL USING LABVIEW
10	EEG ANALYSIS USING LABVIEW
11	DISCRETE COMPONENT BASED PROJECTS
12	HOLLOW GRAPHIC 3D IMAGE DISPLAY- CUBE DESIGN
13	DESIGN OF COMPACT WIDE BAND BOW-TIE DIE ELECTRIC STACKED PTCH ANTENNA FOR KU BAND SPECTRUM

ACHIEVMENTS:

We the department of Electronics & Communication Engineering very proudly announced our payload named **"Measurement of Progressive Magnetic Field Shift"** has successfully completed and submitted to Exseed Space Innovations Pvt.Ltd.(Satellize) on 29th November 2019 for launching in to the space in collaboration with ISRO in the month of April. But as we know that the COVID-19 pandemic has been disturbing all the schedules planned by the Academic and Research institutions. So now we are eagerly waiting for

launching date announcement from ISRO. Hope all our dreams come true soon. Meanwhile we the mentors of this project submitting a small report on some of the glimpses of this prestigious academic & research project.

1. <u>Official Announcement / Notification</u>:

Satellize announced the Space Share Program on 03rd August 2019, a unique opportunity for us to fly your payload into space for free.

What is Space Share?

Space Share is a joint initiative of ISRO and Exseed Space to provide free experimental space missions in order to encourage the participation of Indian universities, colleges and NGO's in India's Space Program.

- Up to 10 payloads will be accepted. Only Academic Institutions, NGOs and other governmental agencies/public sector can apply
- All the 10 payloads will be integrated into the Space Share chassis and launched on PS4 (Fourth stage) of a forthcoming PSLV flight.

Who can apply?

- This opportunity is available only for non-commercial entities. You may apply as a college, school, institution, research organization or an NGO. We will finalize 10 space missions from all applicants that will all go into the Space Share chassis.

- You will have to test it to withstand space environment (vacuum, vibration and temperature swings). We (Satellize Team) will help you with all these.

- This is an opportunity for all those who dream of flying their own space mission to learn space technology.

How Do I Apply

- If you are interested, you fill the form out. You will receive an invitation letter for your proposal from Satellize within 2 working days of filling the form. Send us your proposal, detailing the objective of the mission before October 15.

- Shortlisted proposals will be informed by October 20 and will be invited to sign an agreement and attend a one-day workshop. Selected applicants are invited to attend the space-crafting workshop on October 31 and sign the agreement. Upto 2 participants per application will learn the nuts and bolts of making space grade payloads.

- You will also be carried through the Integration Control Document (ICD) which specifies how your payload integrates with the Space Share system, various subsystems interact with environmental, EMI, and other factors.

- You will have 6 weeks to build the payloads and prepare the ICD. Submit your payloads for functional testing along with the ICD by December 13.

- Integration of the payloads into the Space Share chassis will happen by December 20.

- Testing of fully assembled Space Share system and delivery to ISRO will happen by December 27.
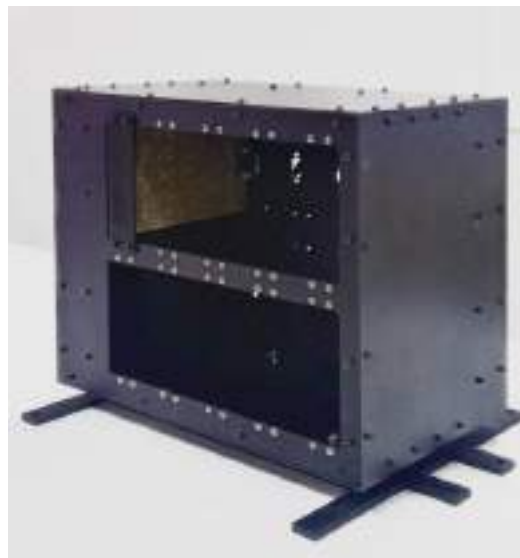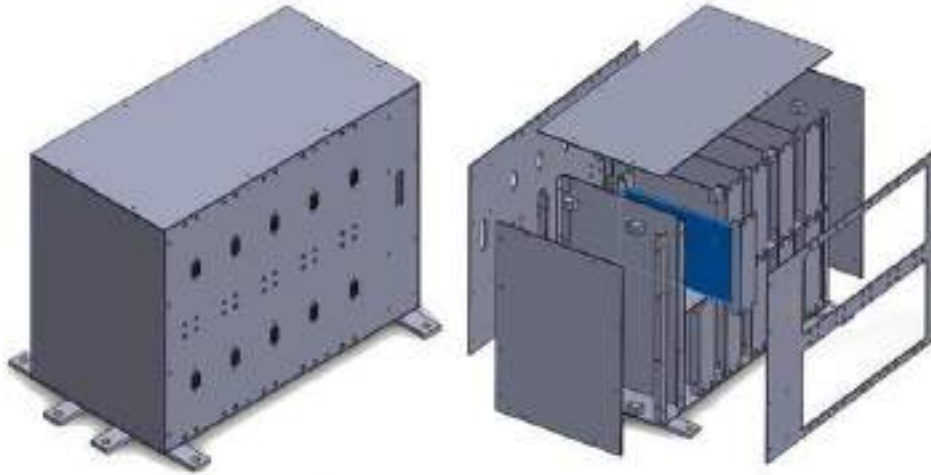
Schematic of Module contains 10 Paylods

2. **Submitted Payload Proposals**:

After the several discussions and meetings with the Head of the department and department R&D team we have finalized the mentor & student team and submitted four proposals to the Satellize after approval of Head of the Institution.

S.No	Mentor Name	Mail id	Mobile No
1	V.Ranjith Kumar	ranjith1029@gmail.com	9492959575
2	K.Miranji	miranji.katta@gmail.com	9652330263

S.No	Student Name	Mail id	Mobile No
1	P.Bharath Kumar	pavuluri1999@gmail.com	8790384032
2	Sandeep Behra	sandeepbehra007@gmail.com	9550884128
3	M.Bhuvanesh	bhuvaneshmarneni@gmail.com	9494676173
4	P.Sai Mahesh	maheshsai425@gmail.com	8790713262

Proposal 1: Space radiation detection using Micro systems

Proposal 2: Temperature Monitoring at polar orbit

Proposal 3: Detection of harmful gases in space

Proposal 4: Biological existence in space

But these proposals have matched with the already accepted proposals of some IITs and Universities. So they have asked us to resend the new proposals for finalization. By taking that situations as a challenge Dept of ECE come back with three new proposals and sent to them in a day.

Proposal 5: Optical medium characteristics in space (Li-Fi)

Proposal 6: Hall Effect Properties in Free Space

Proposal 7: Measurement of Progressive Magnetic Field Shift

Finally out of these three proposals satellize accepted and approved **"Measurement of Progressive Magnetic Field Shift"** as the payload and given us an opportunity to work with them while designing and testing.

Proposal letter from the Institution

1. **Financial Assistance from the Management:**

For successful completion of payload designing and testing we requested an amount

of Rs 3,00,000/- from the management and they have sanctioned Rs 4,00,000/- to complete it within time.

The expected expenditure details are given below.

S.No.	Section wise - expenditure requirement	Amount
1	Design of Payload circuit (Electronics, sensors, PCB design and development etc.)	Rs.1,50,000/-
2	Thermovac testing and Vibration testing for one time. (If in the case of duplication of the required payload we need to go for one more testing slot and we have to pay the amount again)	Rs.100000/-
3	Training to students and mentors at various stages, (TA & DA)	Rs.50,000/-
	Total	Rs.3,00,000/-

As per the guidelines given by ISRO-Satellize payload, the entire proposal mission is divided into four modules.

Module 1: Space crafting Four-day workshop at Hyderabad

Module 2: Design of payload circuit (Electronics, sensors, PCB design and development)
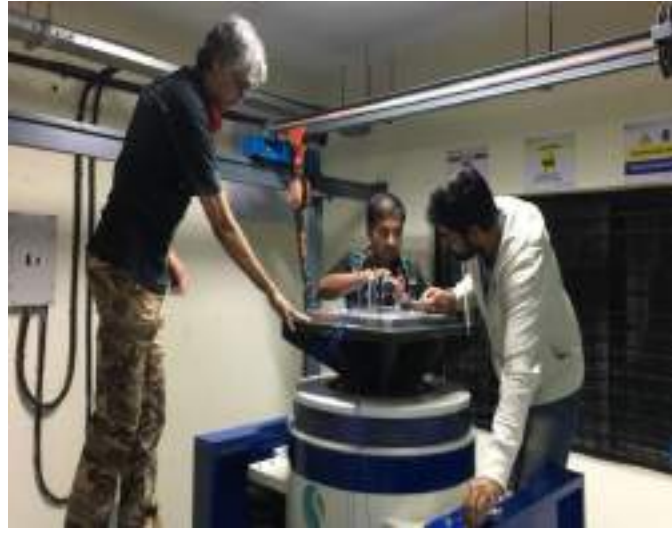
Module 3: Thermovac testing and Vibration testing

Module 4: Payload prototype development and submission

Explaining about STM 32 to the Members of Lamakaan Amature radio club members

Payloads In built Module Pictures during workshop

Satellize Chief Ashhar Farhan is Testing the CUBESAT in a chamber

Payload prototype development and submission:

For the development of protocol, payload prototype and submission of payload to satellize once again we visited the satellize for seven days (04.02.20 to 10.02.20). During the development of protocol we have taken the support of thingTronics Innovations Pvt.Ltd, Banglore Who are having a MOU with our college.

Submission of Payload to the Satellize after Successful Completion

satellize

Date: 16-03-2020

To,

The Principal,

Sir C. R. Reddy College of Engineering,

Vatluru,

West Godavari- 534007

Dear Sir,

We at Satellize congratulate you and your college, specially the team behind the payload titled **"Measurement of Progressive Magnetic Field Shift"** that was accepted and successfully completed. We have been informed that this payload has been successfully integrated into the 'Spaceshare' and we at Satellize are now awaiting intimation from the 'Indian Space Research Organization (ISRO)'about the launch date. We shall keep you informed about the launch date once we get the confirmation from ISRO.

Thanking you,

Satellize

M/s Exseed Space Innovations Pvt. Ltd.

Swati Building, North Avenue,

Santacruz West,

Mumbai-400054

Received

Head of the Department
Electronics & Communication Engg.
Sir C.R.R.College of Engineering
Eluru - 534 007

Exseed Space Innovations Private Limited, Swati Building, North Avenue, Santa Cruz West, Mumbai 400 054 India

Acknowledgement from Satellize after Successful Completion of Payload Submission

Some of the Important projects carried out under R&D Cell:

1.BIOMETRIC BASED ATTENDANCE SYSTEM:

Description: The objective of voting is to allow voters to exercise their right to express their choices regarding specific issues, pieces of legislation, citizen initiatives, constitutional amendments, recalls and/or to choose their government and political representatives. Technology is being used more and more as a tool to assist voters to cast their votes. To allow the exercise of this right, almost all voting systems around the world include the following steps:

· voter identification and authentication
· voting and recording of votes cast
· vote counting
· publication of election results

Tools used: LPC 2148 Micro controller, ORCAD PCB Design tool, Keil Software

2.AGRICULTURAL SOIL TEST SYSTEM:

Description: The main objective of the project is to develop a smart wireless sensor network (WSN) for an agricultural environment. Monitoring agricultural environment for various factors such as soil moisture, temperature and humidity along with other factors can be of significance. This project investigates a remote monitoring system using Zigbee. These nodes send data wirelessly to a central server, which collects the data, stores it and will allow it to be analyzed then displayed as needed and can also be sent to the client mobile.

Tools Used: Arduino IDE, Zigbee Module, Arduino Uno.

3. SMART AUTO CAR PARKING SYSTEM:

Description: Smart Parking systems typically obtains information about available parking spaces in a particular geographic area and process is real-time to place vehicles at available positions. It involves using low-cost sensors, real-time data collection, and mobile-phone-enabled automated payment

systems that allow people to reserve parking in advance or very accurately predict where they will likely find a spot. When deployed as a system, smart parking thus reduces car emissions in urban centres by reducing the need for people to needlessly circle city blocks searching for parking. It also permits cities to carefully manage their parking supply Smart parking helps one of the biggest problems on driving in urban areas; finding empty parking spaces and controlling illegal parking.

Tools used: ARM 9 Micro controller, Keil Software

4. POWER THEFT CONTROL:

Description: Electricity is a necessary energy for our daily life; with the increasing demand of electricity, power theft is also increasing that affects power sector across the whole country. The main aim of this project is to monitor any power drawn before the energy meter which is treated as power pilferage .Once such power is detected it results in disconnection of the power supply to the consumer and an SMS is sent to the control station to take penal action on the fraud consumer.

Tools Used: Atmega8 Micro controller, Kiel software

ADVANCED ANALOG AND DIGITAL CIRCUIT DESIGN
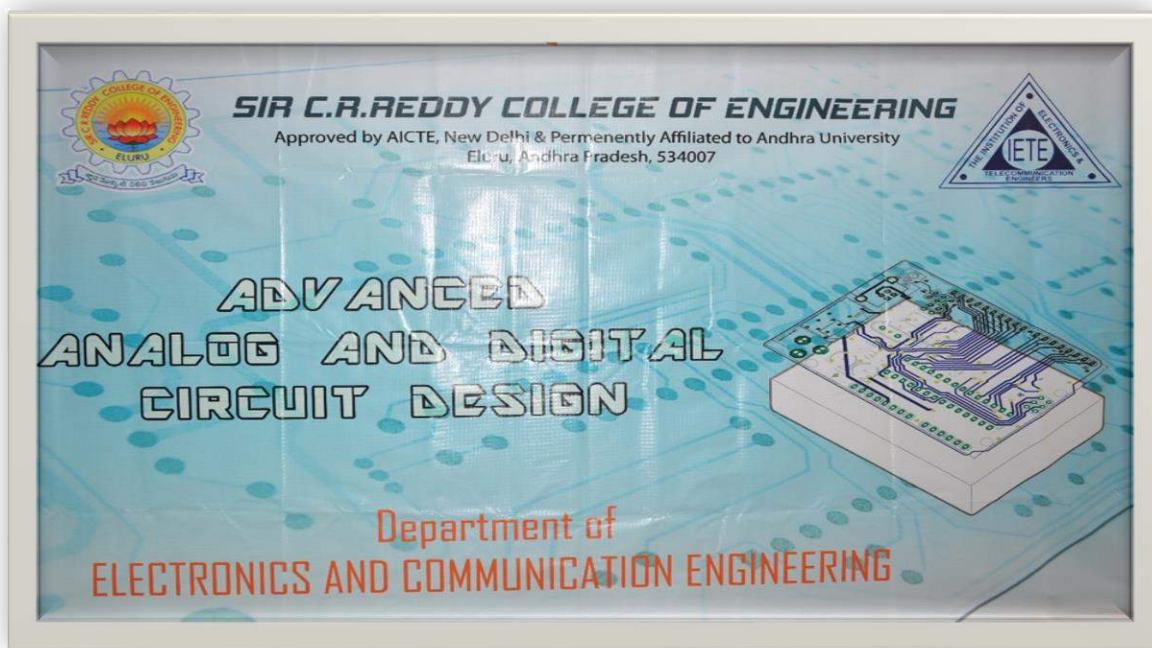
Objectives of conducting workshop

- To make students learn and interact with renowned industry experts.
- Make Students to receive an parallel education on the art of Analog and Digital circuit inherently **PCB Designing** with personal one on one attention.
- To make every student an expert in designing their own **PCB board** which would be very useful for developing their own projects.

Overview about Workshop

The aim of this workshop is to make the students learn the what are the different analog and digital circuits available,Designing and manufacturing of a printed circuit board using open source KICAD PCB design software and with various active and passive components such as Regulators, Diodes, Resistors, Capacitors, Inductors, Switches, etc

Technical Support:

The workshop was conducted in collaboration with **M/s QUE TECHNOLOGIES**from Vijayawada. The company has a fast growth in PCB designing and Robotics. The company's Manager Mr. Kranthi Kumar accompanied with M.Srinivas, P.Srikanth, K.Anil attended the workshop for guiding the students in learning the technologies of the Advanced Analog and Digital circuits along with PCB Design. They have taken about 16 hours of theoretical and practical sessions for Each section.

Department of ECE:

Department of ECE has taken the opportunity to conduct the workshop in Sir C R Reddy college of Engineering. As the theme of the workshop is the core for the Department , it's a nice opportunity for the students to learn the technology and to implement that practically.

Workshop In charge: **Sri R. Satish, Asst. professor, Dept of ECE**

Workshop Coordinators: **Mr. K. Miranji, Asst. professor, Dept of ECE**

Mr. V. Ranjith Kumar, Asst. professor, Dept of ECE

Mr. A. Vamsi Krishna, Asst. professor, Dept of ECE

Dept. HOD Dr. T Venkateswara Rao, President and Correspondent Sri Kommareddy Rambabu, Principal Dr. G. Samba Siva Rao, Managing Director of Que Technologies Sri B. Kranthi Kumar

Dr. T. Venkateswara Rao HOD of ECE Address the students and he motivates the students towards role of such a type of workshops how they fill gap between academics and Realtime Environment.

Sri Kommareddy Rambabu Garu President of Sir C R R Institutions and Correspondent of Sir C R Reddy College of Engineering Address the students and he told we will Provide continuous support for this type of programs

Dr. G. Samba Siva Rao, Principal of Sir C R R College of Engineering address the students and he told "Incubation center" is going to Established in our college in near future. It will provide continuous support to the students.

Resource person, Managing Director of QUE Technologies Sri B. Kranthi Kumar Address the students and encouraged to do their best in this Hands on Training session. And He continues his theory session.

After the inaugural Function Theory session is continued ….from 11.00AM onwards

1. **Basic Circuits and PCB Concepts**

   First of all they have given the concepts which will be very helpful for designing the PCB practically, using some power point presentations. In this theoretical explanation part they have explained about the CAD software and the use of software for further practical implementation in designing the PCB. They have also given a briefing about Analog and Digital Circuits and various active and passive electronic components which they will be using in a PCB.

2. Editing and Routing

Editing and Routing is the basic step and it is one of the important step for designing a PCB. Editing and Routing gives the circuit layout from one component to the other components. The same can be implemented with PCB Wizard.

3. Print Student Made projects Layouts on Trance paper

This is a step done using CAD tools. In this step the components in the circuit and the respective libraries are selected in this software. So that the required circuit will be

designed in the software and a print of the same will be taken on a sheet. The same print will be useful for the further process.

Day 2

4. **Toner Transfer Method**

This is the step where the designed circuit will be pasted on the wafer and this will be passed through a temperature of about 160 to 180 degrees so that the tracks of the circuit will be remained on the wafer. The tracks will be a conductive type.

5. **Drilling Technique**

The board will be drilled with holes where the components have to be placed; the holes will be drilled in the board depending on the terminals available for the components in the design. The hole should be in the size so that the terminal has to be freely placed in the hole.

6. **Soldering Technique**

The components that are placed in the board should be soldered to the track so that the circuit is connected as per the design. After this step the engraved PCB will be ready to use.

7. Testing

This is the last phase of the Circuit design. The implemented projects is it works will or not tested during this phase.

Student Response: Almost 211 students had taken part in the workshop. All the students responded that they have learned and had hands on experience in Analog and Digital circuits Implementation on a PCB. They are very excited in participation in this workshop and requested for more workshops in similar way so that they can simultaneously gain the practical knowledge.

Valedictory and Distribution of Certificates

All the students were awarded with a participation certificate from the company M/s QUE technologies. Head of the Department Dr. T. Venkateswara Rao garu, Manager of Que Technologies Mr Kranthi Kumar and Workshops In-Charge Mr. R.Satish awarded the certificates to all the students by hand. He personally congratulated every student for participating in the event and making it successful.

Vote of Thanks

Mr. R. Satish Workshop Incharge of ECE Department thanked every student for their active participation and interest in participating in the workshop and mentioned about the activities conducted in the college by the department. And he thanked the college

Management for its encouragement for conducting such a useful workshop for student's development and contribution of financial assistance. He promised that department will continue its assistance in conducting these sort of workshops and seminars in future.

He thanked the technical support given by **M/s QUE Technologies.** He personally felt very happy for the response of the company and satisfied with the way they conducted the workshop.

He mentioned about the marvelous support given by the Principal Dr. G. Samba Siva Rao garu to the department in conducting these workshops. He also thanked for the personal interest taken by him in encouraging the department in all aspects.

Vote Of Thanks – Mr.R. Satish