DEPARTMENT OF ELECTRONICS AND COMMUNICATION

THE CONNECT

TECHNICAL ARTICLES

NANO ROBOTICS

Nano-robotics is an emerging field that deals with the controlled manipulation of objects with nanometer scale dimensions.

Typically, an atom has a diameter of a few Angstroms' (1 Å = 0.1 nm = 10^{-10} m), a molecule's size is a few nm, and clusters or nano-particles formed by hundreds or thousands of atoms have sizes of tens of nm.

It can be defined as a robot that allows precise interactions with nano-scale objects, or can manipulate with nano-scale resolution.

Nano-robots Applications-

1. Nano-robotics in Surgery

Surgical nano-robots are introduced into the human body through vascular systems and other cavities. Surgical nano-robots act as semi-autonomous on-site surgeon inside the human body and are programmed or directed by a human surgeon.

2. Diagnosis and Testing

Medical nano-robots are used for the purpose of diagnosis, testing and monitoring of microorganisms, tissues and cells in the blood stream.

3. Nano-robotics in Gene Therapy

Nano-robots are also applicable in treating genetic diseases, by relating the molecular structures of DNA and proteins in the cell.

### 4. Nano-robots in Cancer Detection and Treatment

The current stages of medical technologies and therapy tools are used for the successful treatment of cancer. The important aspect to achieve a successful treatment is based on the improvement of efficient drug delivery to decrease the side-effects from the chemotherapy.

5. Nano-dentistry

Nano-dentistry is one of the top most applications as nano-robots help in different processes involved in dentistry. These nano-robots are helpful in desensitizing tooth, oral anesthesia, straightening of irregular set of teeth and improvement of the teeth durability, the major tooth repairs and improvement of appearance of teeth, etc.

6. ANTI HIV USING NANO-TECHNOLOGY

The immune system is comprised of two important cell types: the B-cell and the T-cell. The B-cell is responsible for the production of antibodies, and the T-cell is responsible for helping them out.
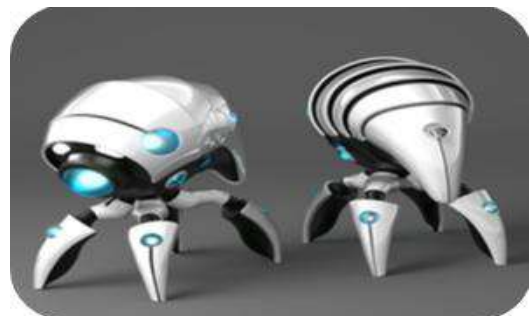
Nano Robots For Military Applications

Nano-dentistry

SACHIN R

ECE 8TH SEM

AUTONOMOUS VEHICLES

An Autonomous Vehicle(self-driving vehicle) is a vehicle that is capable of sensing the environment, processing it and navigating all by itself, without any human input.

Many such vehicles are being developed, but as of February 2018 automated cars permitted on public roads are not yet fully autonomous. They all require a human driver at the wheel who is ready at a moment's notice to take control of the vehicle.

How it works?

There are a plenty of techniques where an autonomous vehicle can be developed to detect its surroundings. Basically, the Vehicle consists of a variety of Sensors such as Radar, GPS, Lasers, LIDAR, and of course Cameras. One of the most important one being the IMU.

IMU, in short for Inertial Measurement Unit, is a device consisting of accelerometers and gyroscopes. It measures the G-Force and keeps track of the vehicle.

The vehicle has **Advanced Control Systems** built into it that interprets all the aforementioned sensory information. This helps the car to identify appropriate path to navigate, as well as detects obstacles and reads and processes Traffic signs such as STOP signs, Speed limits etc.

Why Autonomous Vehicles?

- Eliminates the need for a driver
- Possible reduction in Traffic Congestion
- Smoother and Safer Rides
- Improve fuel efficiency

The Negatives!

- The immediate cause of concern is reliability. Depending completely on a bunch of sensors isn't possible yet. Failure of a small sensor could lead to a catastrophic event.
- Jobs! Adopting Autonomous Vehicles means most drivers will end up Jobless. Hits economy, partially.
- Risks of getting hacked.
- Software Reliability.

The Development

- The first self-sufficient car came from Carnegie Mello University's Navlab and ALV projects in 1984.
- Google has its own Autonomous cars in testing and these cars are tested primarily in suburban neighborhoods at slow speeds and run automatically less than 80% of their time. The test driver takes over 20% of the time.
- Tesla - although capable of fully autonomous travel on highways and also many of the urban situations, the manufacturer requires the human driver to remain alert and ready to take over at any moment.

Verdict

Autonomous Vehicles are very much in their early stages of development and testing. Auto-Pilot, Lane Assist, Parking Assist which have already been implemented on production cars are a sign that we have come a very long way in Artificial Intelligence. Autonomous Vehicles will definitely be a thing of the future but whether people accept fully autonomous vehicles is something only time will tell.

NURO Autonomous Delivery car

NISHANTH REDDY K

ECE 6TH SEM

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LIGHT-FIDILITY [LI-FI]

HISTORY

LI-FI a wireless technology similar to that of WI-FI and is used to transfer data with the help of light.

The word LI-FI was coined by *Professor Harald Haas*, when he was delivering his TED-talk on the topic "Wireless data from every light" Though he introduced the concept in the year 2011 the history of using light as a source of communication was visible in the 1800's
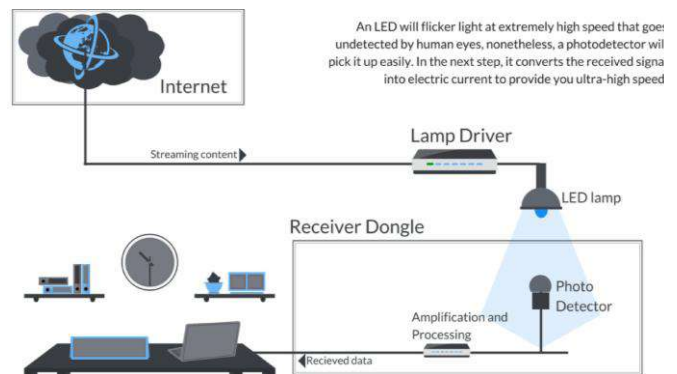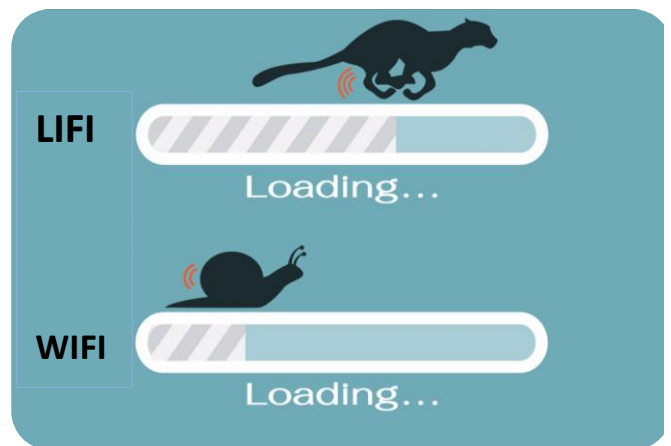
DEFINITION

Li-Fi is a bidirectional, high-speed and is a fully networked wireless communication technology similar to Wi-Fi. It is a form of visible light communication and a subset of an Optical Wireless Communications (OWC) and could be a complement to RF communication (Wi-Fi or cellular networks), or even a replacement in context of data broadcasting.

LI-FI: The Future of Internet

Li-Fi uses light from LEDs, instead of radio waves as in the case of Wi-Fi, to send information in the form of binary data. This binary data is received by the receiver equipped with decoder that decrypts the data and triggers actions in your smart device.

An LED will flicker light at extremely high speed that goes undetected by human eyes, nonetheless, a photodetector will pick it up easily. In the next step, it converts the received signal into electric current to provide you ultra-high speed

As from the above diagram we can observe that there is a LED lamp which acts as a data emitter source and a photo detector acting as a receiver. The LED will be flickering at a very high speed. Palely ON and OFF states stores the data. Later the photo detector uses its decrypting tool and decrypts the input information.

One great advantage of LI-FI over WI-FI is it is very fast when compared to WI-FI. Researchers found that it can transfer over 224 Gbit/sec.

MOHAMMED SHABAZ

ECE 6TH SEM

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Industrial Visit:

(Coordinators : Prof. Jayanthi, Prof. DivyaRajan, Prof. Ashutosh)

Place of Visit	Date	Semester
IISc	23-02-2018	Fourth

INDUSTRIAL VISIT TO IISc

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GUEST LECTURES:

(Coordinators: Prof. Jagadish R K, Prof. Neethu Johny, Prof. Nayana G,

Prof. Naveen H)

Expert	Topic	Date	Semester
Mr.Niranjan H S (Director,Complus Systems Pvt Ltd, Bangalore) BOSCH India	Electromagnetic interference and compatibility	15-03-18	Eighth
Mr.Ravindra M S, Retd. NTTF, Bangalore	Introduction to Mobile Communication	10-02-18	Fourth
Mr.Raveendranath K R (Director at Lekha Wirelesss Technologies, Bangalore	Recent trends in communication System design	22-02-18	Eighth
Dr. V Prithiviraj, Chairman, CSR, Govt.of Puducherry,	IOT BASED SMART CITY	16-03-2018	Sixth

GUEST LECTURE ON INTRODUCTION TO MOBILE COMMUNICATION

GUEST LECTURE ON ELECTROMAGNETIC INTERFERENCE AND COMPATIBILITY


GUEST LECTURE ON "IOT BASED SMART CITY

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Workshops:

(Coordinators: Prof. Naveen, Prof. Rajeev, Prof. Priyamvada Singh, Prof. Rajani)

Topic	Conducted by	Highlights	Date
Research Paper writing using LaTex	Mr. Naveen H and Mr. Rajiv Gopal, NHCE	1. Introductory session on use of Latex for the research paper writing Procedure 2. Installation of the Miktex and Tex-Editor Software. 3. Hands on training on research paper writing using IEEE template, Springer template and Elsevier template.	20th March 2018
Embedded System Design using ARM Cortex M4"	Mr. Mohammed Hussain, StartCom India Pvt Ltd	1. Introductory session on ARM Cortex M4. 2. Installation of Keil µvision 4 3. Interfacing of LED, LCD and UART with Texas manufactured ARM Cortex M4 board.	28th March 2018
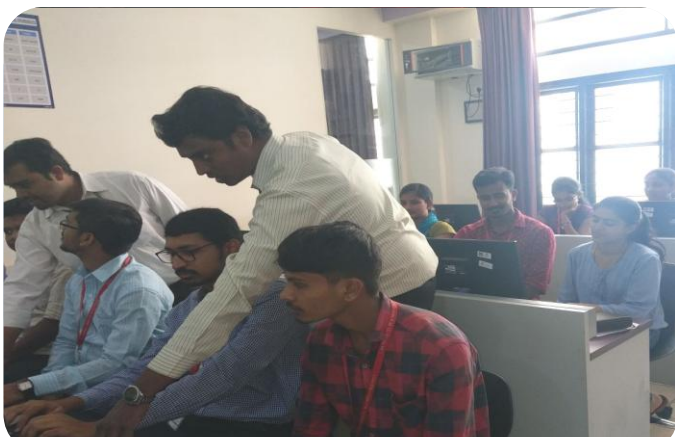
Research Paper writing using LaTex   Embedded System Design using ARM Cortex M4

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Expert lectures:

Semester	Subject	Resource person	Title	Date
4	Digital signal processing	Mr.Shivananada Koteshwar	Digital signal processing	04-09-2018
	System design using HDL	Mr.Shashikanth Patil	FPGA Implementation	16/04/2018
	Linear Integrated circuits	Ms.Dhanaselvi D	555 timer and its applications, ALD1502 and ICL8038	21-04-2018
6	Embedded system design	Mr. Sunder Murthy	ARM Cortex M4	04-11-2018
	Microelectronic circuits	Mr. Srinivasan Pitchai	Current Mirrors and Differential Amplifiers	04-12-2018
	Microwaves and radar	Mr Nageswararao Pedapati Mr.Arijit Das	Microwave active devices	17-04-2018
	Digital Communication	Dr.Vishwas Lakkundi	Building the internet of things: core protocols and standards	21-04-2018

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CLUB ACTIVITIES

Technology sharing club:

Faculty Coordinators: Prof. Divya Sharma, Prof. Karthik C V

What we're about:

     We as a club will provide the right platform to develop your thoughts to innovations which will suffice the need of the hour. Also gives you sorted insight on technology be it former or newfound. An open forum will also be provided for discussions. Lack of Knowledge often leads to mishaps, here at our club we aim to prevent any such mishaps by enhancing your knowledge through fun-learning. We will also provide adequate opportunities for you to share technical thoughts and technical symposiums.

Objective:

     To provide insight into existing and evolving technology and product

ROLE	NAME
President	Mohammed Musaveer
Vice-president	Nagarjun K S
Secretary	Prajwal
Treasurer	Karthik V
Committee Member	Bharath Raj
Committee Member	Harsh Srivastava
Committee Member	Hima Keerthi
Committee Member	Parithosh
Committee Member	Raghavendra V
Committee Member	Preshika
Committee Member	Mohammed Ghassan

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EVENT	DATE	DESCRIPTION
C@NNECT	21-02-2018	1. A session on basics of Python 2. Session on Artificial intelligence 3. Creation of simple AI projects

TECHI HUNT	03-04-2018	1. A platform to unleash the real TECHIE in them
		2. Two rounds: Smart farming and Techie narration
		3. Winners: Naresh
		             Nidhi
		             Harshitha

A session on basics of Python

TECHI HUNT

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ELECTRONICS HOBBY CLUB:

Faculty Coordinators: Prof. Aruna, Prof. Dharmambal

What we're about:

The goal of this club is to implement and demonstrate electronics-based hobby projects and products. By motivating the enthusiasts in trying out the avenues of hardware and software domains of the electronics and communication, this club is aimed at enriching the intelligence as well as wisdom of the technical community.

The Club aims to cater to the various needs to keep in pace with the ever evolving field of electronics Innovation, Imagination and Application is the motto of the club. We aim to provide a platform for the students to showcase their innovative ideas. The Club deals from basics of electronics till the latest developments The Ideas learnt in theory classes can be applied in the real world.

Our Objective:

To implement and demonstrate electronics-based hobby projects and products.

ROLE	NAME
President	Nikhil Riyaz
Vice-president	Hariraj R
Secretary	Janardhan S P
Treasurer	Subramanya G
Committee Member	Shyam S
Committee Member	Akshay Rao
Committee Member	Athira
Committee Member	Kushi Ponnamma
Committee Member	Naveen K R
Committee Member	Sushma
Committee Member	Yasir

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EVENT	DATE	DESCRIPTION
Workshop on PCB Fabrication	03-03-2018	1. Introduction to PCB Fabrication process 2. Hands on Experience on Eagle CAD Software 3. Design of 555 time Astable multivibrator
Arduino Workshop and Arduino Quiz	03-04-2018 04-04-2018	1. Presentation on Arduino 2. Hands-on experience on making a Hand Follower Robot
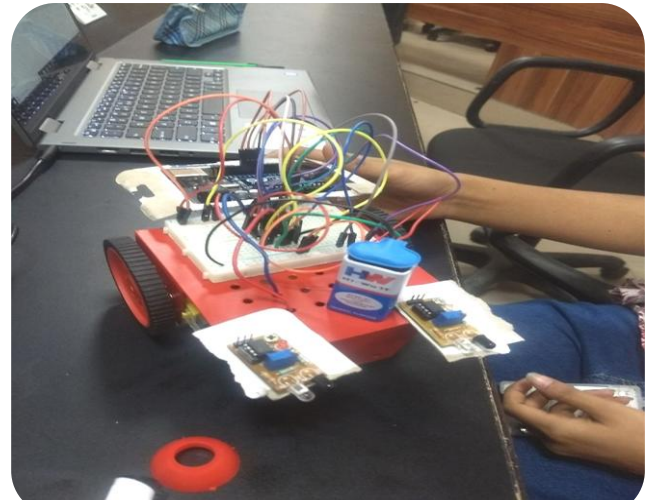
Arduino Workshop and Arduino Quiz

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PROFESSIONAL CONNECT CLUB:

Faculty Coordinators: Prof. Naveen H, Prof. Priyamvada Singh

What we're about:

We help you connect with professionals, professional bodies, research organizations and companies.

We organize guest lectures, seminars, workshops, conferences and competition on technologies, projects and products.

We organize field trips to companies, research institutions and industry exhibitions.

We help to facilitate active participation in external technical events.

Our Objective:

To connect with engineering professionals and conduct technical events.

ROLE	NAME
President	Denzel George
Vice-president	Sanjana Ranjan
Secretary	Shuvam Pal
Treasurer	Rahul S
Committee Member	Nikhil Riyaz
Committee Member	Kushi Ponnamma
Committee Member	Bhavana Savanth
Committee Member	Gautham Sinha
Committee Member	Saleh Junaid Ahmed
Committee Member	Udit Bahuguna
Committee Member	Vidhya Jhadav
Committee Member	Rishita S

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| EVENT	DATE	DESCRIPTION
Visit to Indian electronics week	07-02-2018 – 09-02-2018	1. Theme: "Driving Technology, Innovation & Investment for Smart Products". 2. Talk on evolving ecosystem for entrepreneursand start-ups, capacity building and skills development, creating excellence in innovation, patents,IPR and monetising patents.
Embedded system design workshop	28-03-2018	1. Basic concept of embedded systems 2. Introduction to different types of boards used for different applications.
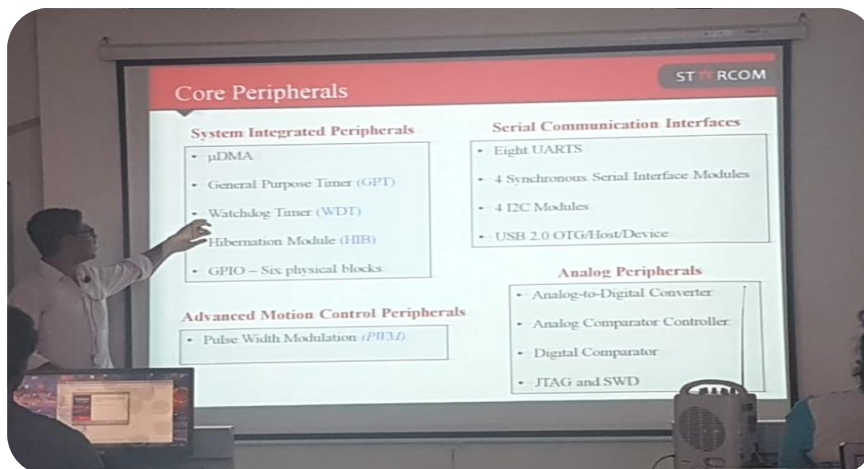
Embedded system design workshop

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CROSS WORD
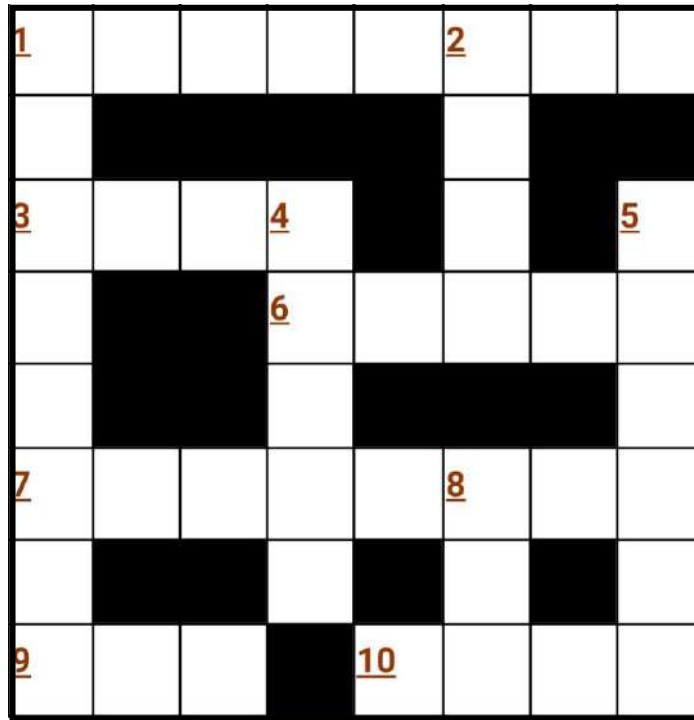
Across

1. Relating to chemistry

3. Fourth planet from the sun

6. The Earth has two _ _ _ _ _ ice caps
.

7. A line on which events are placed

9. The colour of '3 across'

10. One time

Down

1. A machine that computes

2. Opposite of "warm"

4. How fast something moves

5. If you _ _ _ _ _ _ water it becomes ice.

8. A charged particle

BY-

Nagarjun K S
1NH15EC056
ECE

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DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

Vision

To create high quality engineering professionals who can serve the society and earn global recognition.

Mission

- To build strong foundation in Electronics and Communication Engineering aspects by exposing students to state of the art technology and research.

- To strengthen the curriculum through interaction with industry experts to equip the students with the required competency.

- To mould students to share technical knowledge and to practice professional and moral values.

Program Educational Objectives

PEO 1: To produce graduates with understanding of fundamentals and applications of Electronics and Communication Engineering.

PEO 2: To hone graduates with ability to apply, analyze, design and develop electronic systems.

PEO 3: To enhance graduates with latest technologies to enable them to engineer products for real world problems.

PEO 4: To build leadership qualities, management skills, communication skills, moral values, team spirit and lifelong learning ability for the graduates.

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Program Outcomes

B. E graduate should possess the following Program Outcomes-

1. Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems in Electronics and Communication Engineering.

2. Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems in Electronics and Communication Engineering reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

3. Design/development of solutions: Design solutions for complex engineering problems and design system components or processes of Electronics and Communication Engineering that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments in Electronics and Communication Engineering, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

5. Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities in Electronics and Communication Engineering with an understanding of the limitations.

6. The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice in Electronics and Communication Engineering.

7. Environment and sustainability: Understand the impact of the professional engineering solutions of Electronics and Communication Engineering in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9. Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

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PROGRAM SPECIFIC OUTCOMES

Program Specific Outcomes	
PSO1	To demonstrate the ability to design and develop complex systems in the areas of next generation Communication Systems, IoT based Embedded Systems, Advanced Signal and Image Processing, latest Semiconductor technologies, RF and Power Systems
PSO2	To demonstrate the ability to solve complex Electronics and Communication Engineering problems using latest hardware and software tools along with analytical skills to contribute to useful, frugal and eco-friendly solutions.