



## The Connect

DEPARTMENT OF ELECTRONICS AND COMMUNICATION

Issue 9, July 2019

### 5G Wireless Technology

5G simply refers to the next and newest mobile wireless standard based on the IEEE 802.11ac standard of broadband technology. Rather than faster Internet connection speeds, 5G aims at a higher capacity than current 4G LTE, allowing a higher number of mobile broadband users per area unit, and allowing consumption of data quantities in gigabyte per second. This would make it feasible for a large portion of the population to consume high-quality streaming media many hours per day on their mobile devices, also when out of reach of wifi hotspots. 5G research and development also aim at the improved support of machine to machine communication, also known as the Internet of things, aiming at a lower cost, lower battery consumption, and lower latency and to increase the security and connectivity for a large community.

The following are the key takeaways of the 5G network:

- High & increased peak bit rate (Up to 10Gbps connections to endpoints in the field)
- Larger data volume per unit area (i.e. high system spectral efficiency)
- High capacity to allow more devices connectivity concurrently and instantaneously (100 percent coverage)
- More bandwidth
- Lower battery consumption
- Better connectivity irrespective of the geographic region where you are in
- A larger number of supporting devices (10 to 100x number of connected devices)
- Lower cost of infrastructural development
- Higher reliability of the communications (One millisecond end-to-end round trip delay)



Our future of 5G demo experiences at Mobile World Congress 2019

#### How does 5G work?

In 5G, the network service area is divided into small geographical areas called cells. All the 5G wireless devices in a cell communicate by radio waves with a local antenna and low power automated transceiver (transmitter and receiver) in the cell. The local antennas are connected with the telephone network and the Internet by a high-bandwidth optical fiber or wireless backhaul connection. The new 5G wireless devices include 4G LTE support as well to establish a connection with the cell and to connect to the internet at locations where 5G access is not available. 5G can support up to a million devices per square kilometer, while 4G supports only up to 100,000 devices per square kilometer.

5G operates on 3 different spectrum bands.  
 Low-band spectrum – Expect peak speeds up to 100Mbps  
 mid-band spectrum – Expect peak speeds up to 1Gbps  
 high-band spectrum – Expect peak speeds up to 10Gbps

Bhavana Savanth  
8th Sem

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#### STUDENT COORDINATORS:

NAGARJUN K S

SUBRAMANYA S

# INDUSTRIAL VISIT

(COORDINATORS : Prof. Jayanthi, Prof. Jagadish Rao, Prof. Sujitha)

Date	Place of Visit	Semester
12-02-2019	Bharat Sanchar Nigam Limited (BSNL)	IV
20-02-2019	Karnataka Hybrid Micro Devices Ltd (KHMD)	VI
19-03-2019	Centre of Development of Advanced Computing (C-DAC)	VI
22-03-2019	El measure India Private Limited	IV

## INDUSTRIAL VISIT TO BHARAT SANCHAR NIGAM LIMITED(BSNL)

An industrial visit to BSNL was scheduled for 4th sem students of Electronics and Communication Department on 12/02/19. Total of 59 students attended the visit .They were divided into three batches of 20 and 19 students..

Sub divisional engineer Mr. Vinod divided the students into three groups and each group were thought about different modules namely switching, transmission and MDF (Main distribution function). In switching module, students learnt on practical aspects of call making and receiving.

They were thought on how to create the calling number and how to check the dial tone. In transmission module, students were briefed about OFC communication and its uses, advantages, applications. The students were shown the real cables and its working procedure. In the MDF module, students learnt about the requirement of main distribution function.



They were briefed about line side and exchange side of MDF. The students were shown the functioning parts of distribution unit. The industrial visit ended by 1:30 PM.

A telephone exchange consists of 4 functional blocks:

- 1) SWITCH ROOMS
- 2) MDF (Main Distribution Frames)
- 3) TRANSMISSION ROOMS
- 4) TELECOM SUPPORT INFRASTRUCTURE.

**1) SWITCH ROOMS:** a) It consists of digital electronic switches which guides the user to the destination by identifying a physical communication path. b) This identification is done with the help of logical or directory numbers. c) We were shown, how the switches work in real time, with an operating terminal.

### 2) MDF (MAIN DISTRIBUTION FRAME)

- a) All subscriber lines are terminated at the end of MDF.
- b) It consists of front (line) end and a back (switch) end which are inter-

connected with the help of a jumper.

- c) A safety point is created in MDF to avoid any damages caused due to faults at the customer end. The jumper of an MDF consists of gas discharge tubes which eliminates the faults.

### 3) TRANSMISSION ROOMS:

- a) The main function of transmission rooms is the interconnection of 2 exchanges within or outside the town. It involves optical fibre communication.
- b) Voice signals are first identified. 30 voice channels are combined with the help of first order European multiplexers which can handle a speed of 2.048Mbps.
- c) Pulse Code Modulation of voice signals are carried out along with digitization. Voice signals of frequency 0-4 KHz are converted to 64Kbps. The industrial visit was very helpful in providing us a better understanding of the theoretical concepts of the subject Digital Switching Systems.



## INDUSTRIAL VISIT TO CENTRE OF DEVELOPMENT OF ADVANCED COMPUTING(C-DAC)

An industrial visit was organised by our ECE department on 19th March, 2019, Tuesday. We were taken to C-DAC (centre of development of advanced computing). It is a professionally managed company is an Autonomous Scientific Society of Department of Electronics and Information Technology (DeitY), Ministry of Communications and Information Technology, Government of India.

C-DAC provides several courses in the field of advanced computing and software development. Among these are the hpc (high performance computing) certification course CDAC Certified HPC Professional Certification Programme (CCHPCP) Around 64 students from our department participated in the industrial visit. We left the college at 1:30 pm and reached the destination by 2:30 pm. Students were guided by Mrs. Divya senior person of the company. They took us to the place where supercomputers (param) were assembled. PARAM is a series of supercomputers designed and assembled by the Centre



for Development of Advanced Computing (C-DAC) in Bangalore, India. The latest machine in the series is the PARAM ISHAN. Parama means supreme in Sanskrit Language.

The system (super computers) was equipped with air conditions and maintained under 25 to 27 degree Celsius for optimized running of the processors. Network Infrastructure Computing node of PARAM are interconnected by a high-bandwidth, low-latency interconnect network

InfiniBand: 100Gbps

Omni-path :100Gbps

Rules by the government of India has set a limit to power consumption to companies, hence it is very important that these super computers do not consume more power and hence efficient coding and such factors were to be maintained.

In computing, floating point operations per second (FLOPS, flops or flop/s) is a measure of computer performance, useful in fields of scientific computations that require floating point calculations. For such cases it is a more accurate measure than measuring instructions per second. The similar term FLOP is often used for floating-point operation, for example as a unit of counting floating-point operations carried out by an algorithm or computer hardware.

.All together it was good exposure on supercomputing and supercomputers. We would like to thank our department for giving us this wonderful chance to get to know more about supercomputers.

## INDUSTRIAL VISIT TO EL MEASURE INDIA PVT LTD

Industrial visit was organised by ECE department to El measure India Private Limited on 22-03-2019 for second year students. This organization was established in the year 2004, at Bengaluru, Karnataka, India, and it is one of the Manufacturer and Exporter of a wide range of Energy Management Systems like Power Monitoring Systems, Multi-function Meter, Prepaid Energy Meter, Power Control Products, Load Manager Multi function Meters, Energy Management System, Digital Panel Meter. This organization is a pioneer in the field of Manufacturing, Exporting of Energy Management Systems and they provide centralized power monitoring, facility controlling. Thus they offer one of the most cost effective solutions to the organizations wherever installed. They have installed their products at different kinds of estab-

lishments including Hospitals, Hotels, Airports, Railways and other areas

Around 55 students from ECE department participated in the industrial visit. Students were guided by Ms. Preetha from Human Resource Department. Initially the students were divided into two groups and one group was taken to the video conferencing hall and a video has been played about what is the process that is taken place in the company and about the various branches of the company. One more batch was taken to the manufacturing unit of the company and there they explained about the different processing steps for manufacturing the energy meters. The initial step was the pro-

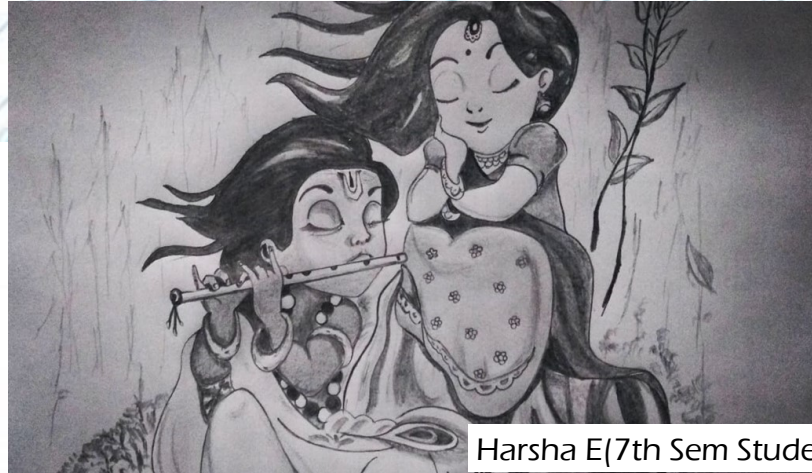


gramming with the help of a base software in a system and then mechanical Assembling of the components are done called as boxing. The next step was called soaking and the final step was calibration where with respect to a reference source the difference is found as error and it is offset through software. After calibration the final testing and packaging of the products are carried out.

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# The Connect

PENCIL SKETCH



Harsha E(7th Sem Student)

**ON AIR**

Artificial Intelligence Based Stress Level (ಒತ್ತಡದ ಮಟ್ಟ) Analysis using Brain-Computer Interface on yoga practitioners

Tune to FM Rainbow 101.3  
17<sup>th</sup> April 2019  
Wednesday at 8pm

**Karthik R**  
B.E (ECE)

**Sumanth R**  
B.E(ECE)

**Roopa D Almeida**  
B.E(ECE)

**Arvinda Koithyar,**  
Senior Asst prof,  
Dept. of ECE,NHCE

**Mr.Naveen H,**  
Asst Prof, Dept. of  
ECE,NHCE

**Dr.Ravish H**  
Asst prof, Dept. of  
Neurochemistry,  
NIMHANS

**NEW HORIZON**  
COLLEGE OF ENGINEERING

**INTERNATIONAL INSTITUTE OF MENTAL HEALTH CARE**

## FACULTY ACHIEVEMENTS

## REVIEWER CERTIFICATE

INTERNATIONAL TRANSACTIONS ON  
**ELECTRICAL ENERGY SYSTEMS**

THIS CERTIFICATE IS AWARDED TO

**K. C. R. NISHA**

WE HEREBY NOTIFY THAT THE PERSON ABOVE HAS BEEN SERVING AS A REVIEWER OF  
*INTERNATIONAL TRANSACTIONS ON ELECTRICAL ENERGY SYSTEMS.*

WE ARE GRATEFUL TO K. C. R. NISHA FOR REVIEWING 3 MANUSCRIPTS IN 2018.

**Chongqing Kang**  
Editor-in-Chief

15 April 2019

**WILEY**



# GUEST LECTURES

(COORDINATORS : Prof. Dharmambal , Prof. Divya Sharma, Prof Ashutosh )

Date	Resource person	Title	Semester
04-04-2019	Mr.G.Muralitharan , Emids Technologies, Bangalore	Exception Handling	VI
11-04-2019	Mr.Kulbhusan Bhaji Pataria, ADA,Bangalore	Recent trend on Embedded System-Airborne applications	VI
13-04-2019	Mr.D.Suresh , Renesas Electronics India Pvt. Ltd., Bangalore	Advanced Digital Communication and its application	VI
13-04-2019	Mr.ShashikanthPatil, Wipro Technologies, Bangalore	Designing with FPGA	IV
16-04-2019	Mr.KumaranSethuraman, Intel Technologies	DSP Processor and Digital filter	IV

## Technology Against Terrorism

Technology has evolved so rapidly and so much more powerful over the past few decades that now a fear hover over us. A fear that if this sophisticated technology falls into the wrong hands, it could mean doom to humankind. While this has happened, we have counter reacted by creating counter attack measures to eradicate terrorism. Here are some of the latest arsenals in the field of Electronic Weapon Sciences.

### Directed Energy Weapons

Developed at the Lawrence Livermore National Laboratory, this military weapon is LASER gun straight from Science Fiction. This LASER is built by assembling an array of 192 LASERS and aiming them at a hydrogen pellet. Each beam starts out low powered, as low as the LASERS inside a DVD player, but as they pass through a complex maze of tubes spanning 330 meters, 10 storeys high, they merge into one super beam. This super beam fires 500TW of power in 2ns. When is light strikes the Hydrogen pellet, it cooks it to over 800 million degrees creating nuclear fusion. It has been theorized that these beams can bounce off satellites and attack any part of the world at the speed of light.



Based on this concept the Tactical High Energy Laser (THEL) was built by the US Military.

The THEL is used to shoot incoming missiles and Enemy jets right out of the sky. It has a range of about 10Kms. This LASER automatically detects incom-

ing missiles, locks its target, calculates its trajectory and swivels towards the target and fire a high energy LASER beam. The beam is a few inches in diameters but is powerful enough to burn through steel. It delivers 680 degrees in one second, which is enough to burn through a missile and destroy it in a few seconds.

### Non-Lethal weapons

#### Electromagnetic weapons:

Electromagnetic Pulse (EMP) is a short burst of electromagnetic energy that can disrupt or damage electronic

circuits. These EMPs can be used to immobilize Vehicles without affecting the driver instead.

#### What does an EMP do?

When EMP passes through metal objects like a phone, computer, or radio, they can "catch" this incredibly powerful pulse. This can generate a rogue current of electricity that moves through a modern device's tiny circuits and can disrupt or even destroy them. Power transmission or telecommunications equipment, meanwhile, can overload from the excess current, spark, and fail.

Microwave Weapons or High-Power Microwave (HPM) weapons:

The 'Active Denial system' deters attackers by sending a non-lethal millimetre wave of electromagnetic energy, causing a burning sensation. The wave penetrates the skin to 1/64 of an inch, causing a feeling similar to being on fire. A2 second burn can heat the skin to 55°

*Stanislaus Lasrado*

IV B Sec, ECE Dept

# TECHNOLOGY SHARING CLUB

(COORDINATORS : Prof. Divya Sharma , Prof. Neethu Johny )

## 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 sort-of 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	Prajwal
Vice-president	ParithoshVema
Secretary	Mohammad Ghassan
Treasurer	Harsh Srivastav
Committee Member	Karthik V
Committee Member	Mohammad Musaveer
Committee Member	Nagrajun K S
Committee Member	Anju Gopinath
Committee Member	Preshika
Committee Member	Shiva
Committee Member	Kiran

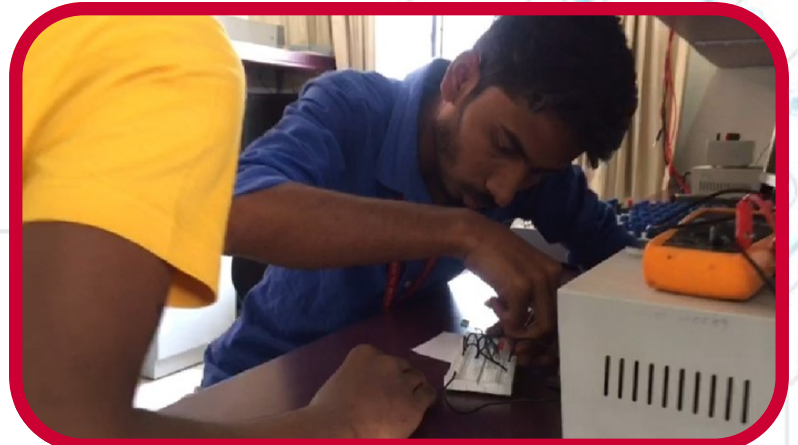


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# The Connect

## TECHNOLOGY SHARING CLUB

Event	Date	Description
Tech Talk on Machine Learning	15-03-2019	Fundamentals Real time applications
BRAINY GAMES	05-04-2019	General Quiz Code Debugging Circuit Debugging



**TECH TALK ON MACHINE LEARNING  
BRAINY GAMES**



# ELECTRONICS HOBBY CLUB

(COORDINATORS : Prof. Dharmambal , Prof. Aruna M S )

## 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.

## Objective:

To implement and demonstrate electronics-based hobby projects and products to enable students to have hands on experience on current technologies.

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

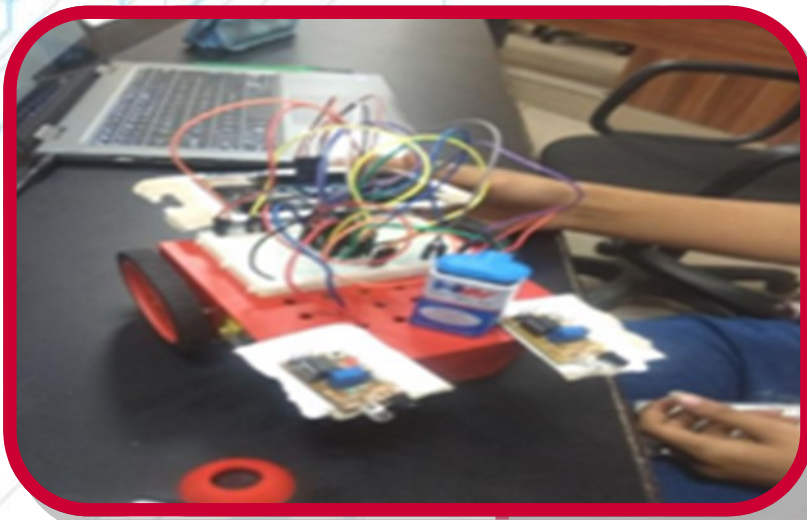




# The Connect

## ELECTRONICS HOBBY CLUB

Event	Date	Description
Soldering Workshop	13-03-2019	process of Soldering Soldered the NE555 timer PCB
SENSORS AND ARDUINO	17-04-2019	Presentation on Arduino and Sensors Hands-on experience on making a Hand Follow er Robot



**EHC CLUB EVENTS**

# PROFESSIONAL CONNECT CLUB

(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.



Professional Connect  
Club

## Objective:

To connect with engineering professionals and conduct technical events.

ROLE	NAME
President	Jagadeesh D
Vice-president	K Girivardhan
Secretary	Dennis Vincent
Treasurer	Bipin Dixit H
Committee Member	Devashrutha
Committee Member	S Rishitha
Committee Member	Naveen K M
Committee Member	Hari Prasad
Committee Member	GirishJattu Gouda
Committee Member	Lingesh T
Committee Member	Isabella Paul
Committee Member	Kavya S





# The Connect

## PROFESSIONAL CONNECT CLUB

Event	Date	Description
Marine Exploration – Build your own ROV	16-04-2019	Fuelling the objecting of the Professional Connect Club, the Remotely Operable Vehicles were demonstrated, enabling students to have hands-on experience on how to build their own ROVs.
Jalayantra 2019-ROV Competition	27-04-2019	In the Competition the participating groups taking part in the first round, which was a checkpoint race, where there were five bottles placed around the pool in strategic places, and the groups had to decide which route to take achieve the fastest time. This placed a huge focus on the speed and efficiency at which the ROVs moved. The structural integrity also came into the picture, as when the ROVs dove underwater, they had to be able to surface.



**BUILD YOUR OWN ROV  
JALAYANTRA-2019 ROV COMPETITION**

# IEEE ACTIVITIES

(COORDINATORS : Prof. Nisha KCR )



## National Seminar— “New Space – An Era of Small Satellites : Opportunities and Challenges”

A National Seminar on “New Space – An Era of Small Satellite: Opportunities and Challenges” was hosted by ITCA (Indian Technological Congress Association) , supported by IEEE NHCE Student Branch, NHCE R&D team and the Department of ECE on 11<sup>th</sup> April 2019 from 10 am to 5:15 pm.

The Master of Ceremony, Ms. AthiraAjayakumar,Vice chair, IEEE NHCE SB addressed the gathering on the agenda of the program. The HoD of ECE, Dr. Sanjeev Sharma,presented the Welcome Address and set the context of the program. Ms. Athira shared the evolution of the NHCE Student Satellite Program, which was validated by showing a video of the same to the audience. After which, the Principal of NHCE, Dr. Manjunatha, shared his thoughts on the rapid progress of the NHCE Student Satellite Program.

The keynote Speech by Padmashri. Vasagam, gave a brief outline on the different Satellites. Not only did he talk about his experience working in ISRO and on his projects but also encouraged students in making their own satellites.

Configuring a spacecraft and the challenges it poses while building it, was dealt by the President of Planet Aerospace, Mr. R.K Rajangam. He went in depths on the technical configuration of building satellites. He also offered various solutions to the most commonly seen problems that occurs while building satellites. Mr.Venkat Rao, Former Systems Engineer for Electro-Optical Payloads of ISRO, explained about the different payloads.



*He shared his technical experience in working with different payloads and the different criterions one must take care while working with payloads.*

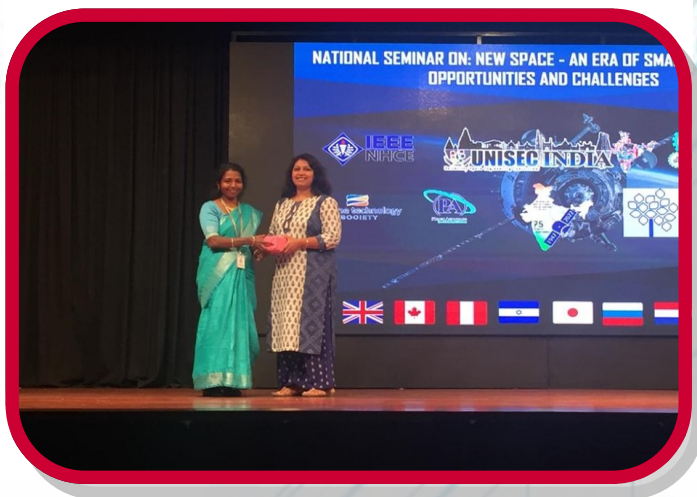
*Post lunch break, Sudip Kar, founder of D’VINE Research Labs, emphasized on the commercial aspects of the Satellite Industry. He briefly explained the various subsystems present in a small satellite and how satellites are crucial in this era.*

Ms. Pramitha Ramaprakash, Founder of Transcend Satellite Technology, informed the audience about CubeSat and CanSat. She explained the System Design of a CubeSat, the Quality Testing of satellites, the software development. She also intimated the students on the CanSat Challenge, which will be held in Serbia, encouraging students to take part in this challenge. Dr.Nisha IEEE NHCE SB councilor has presented a memento to Ms. Pramitha

The final speaker was Shri B. A Subramani, Secretary and Station-in-Charge of ISRO’s Upagrah Amateur Radio Club, propagated enthusiasm among students to join and venture the HAM society. He pointed out the various free frequencies one can transmit and receive message though and also highlighted the advantages of Satellite Communication over Terrestrial Communication.

150 students from various departments and semesters of NHCE and few faculty members were the benefitted attendees of the event.

Ms. Athira concluded the session by expressing gratitude to all the speakers, the organizing team, faculty and students.





# IEEE ACTIVITIES

(COORDINATORS : Prof. Nisha KCR )



## Recent Trends on Embedded System: Airborne Electronic Applications

The EC Department in association with IEEE NHCE SB had organized a guest lecture on 11<sup>th</sup> April 2019 in Embedded Systems & Design. The speaker for the lecture was Mr. Kulbhushan Bhaji Patariya who is a Scientist from Aeronautical Development Agency (ADA), Bangalore. He has over 8 years of experience in Software verification of Avionics Line Replacement unit for aircrafts and is very skilled in various hardware level languages. He also contributed towards the development of "DRDO standard for Software Development Guideline". This guideline is developed by DRDO for software development to be followed throughout all the DRDOs.

The scientist started off by giving a brief introduction on what an embedded system is, how they are classified in different fields and the features. The session was very interactive,



Mr. Kulbhushan told about his line of work, where the quality factors of an embedded system played an important role. As the factors were about real time situations, individual system check, behavior of the company and other factors.

He discussed the various factors by showing us a couple of videos which taught us that quality is more important than quantity, how teamwork and proper communication

plays an important role. The speaker discussed about the weapons integration on the line control unit along with the software and hardware integration in aircraft. He discussed about the working of aircraft pylons, he explained everything briefly such that all the students understood it. He concluded the session with a Q&A session with the students and the faculty members.

The session ended with a vote of thanks and a felicitation to the speaker by the event coordinator Ms. Dharmambal

## IEEE PELS and IES Bangalore Chapter AGM

PELS and IES Bangalore Chapter AGM 2019 meeting was started at 10 AM in Falconry hall. Dr. Mini Sujith, Professor, Amrita College delivered the welcome address for the AGM meeting 2019. Prof Kaushik gave the chair's address going over the achievements of both societies in the last year. He also highlighted the plans for 2019 and the roadmap of events like workshops, society registration etc. He also emphasized to apply for "Distinguished Lecture" program for bringing in the expert to provide lecture series. Transportation and Electrification workshop along-with list of contacts from both academia and industry are couple of other additional areas of work to be take up in 2019. He also highlighted the need for secretaries to drive the ExCom meetings and subsequent follow-up items (MoM, reporting to vTools etc.) by creating smaller teams.



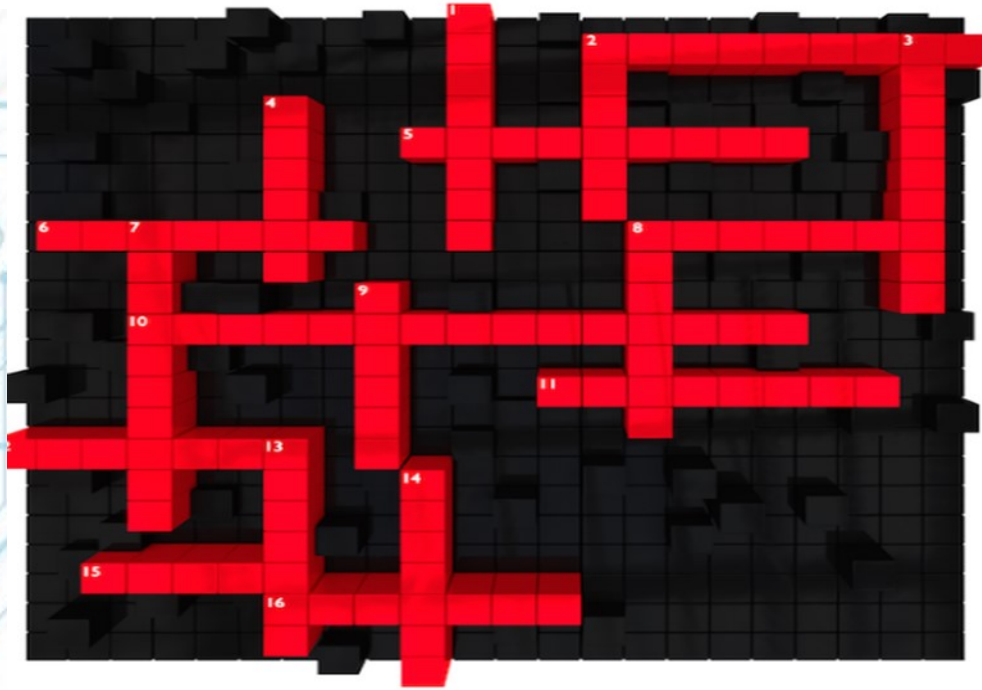
Mr. Anand Rao from OTIS presented the secretary report for IES Chapter. Treasurer report was given by Dr. Kaushik Basu on behalf of treasurer, Mr. B Saravanan

The slate committee proceedings was initiated by Dr. Hariram on behalf of Mr. Rajashekhar As per the suggestions and recommendations of the current ExCom, the IES slate committee was proposed to Mr. Rajashekhar over phone. As there were no petitions received, the proposed slate for IES Bangalore chapter been accepted. the proposed slate committees were proposed by Mr. Nishanth from NHCE and

seconded by Mr. Anand.

Dr. Hariram gave the Chair's address for IES. He spoke in detail about the benefits of becoming an IEEE and society member. He also highlighted the need for working together between multiple chapters that have overlap. Dr. Nisha, Professor from NHCE gave the vote of thanks for the AGM Meet 2019. The event was followed by High tea and refreshments.

# CROSSWORD



## Across

2. A diagram that shows the electrical connections of the electronic components
5. Current is considered to be the movement of \_\_\_\_\_.
6. A voltage source that converts chemical energy to electrical energy
8. A flow of electric charge
10. A characteristic of a secondary cell
11. A material that is composed of a mixture of element
12. The term used to designate electrical pressure
15. A short circuit will have a \_\_\_\_\_ current flow.
16. The part of an atom that has no electric charge

## Down

1. A voltmeter is used in \_\_\_\_\_ with the circuit.
2. A device that opens or completes an electrical path
3. A material that opposes the movement of free electrons
4. One coulomb passing a point in one second
7. A resistive component that is designed to be temperature sensitive
8. A unit of charge that contains  $6.25 \times 10^{18}$  electrons
9. An atom's atomic number is determined by its number of \_\_\_\_\_.
13. A substance that is found only in its pure form
14. It is used to measure current.



# The Connect

## 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.

## PROGRAM OUTCOMES

### **B. E graduate should possess the following Program Outcomes-**

**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.

**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.

**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.

**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.

**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.

**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.

**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.

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

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

**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.

**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.

**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.



# The Connect

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

### *PROGRAM SPECIFIC OUTCOMES*

<b>Program Specific Outcomes</b>	
<b>PSO1</b>	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
<b>PSO2</b>	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.

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION

New Horizon College of Engineering  
New Horizon Knowledge park,  
Ring Road Marathalli

<http://newhorizonindia.edu/nhengineering/department-of-electronics-and-communication-engineering/>



**Dr. Sanjeev Sharma**

Professor & Head

and social activities. The students of ECE department have obtained gold medals and many ranks in the university. They have also won several trophies in sports and cultural events.

The students also undergo special placement training through value added programs. They get placed in reputed organizations such as Intel, Texas Instruments, AMD, Qualcomm, ARM, Schneider Electric, Bosch, Cisco Systems, Juniper Networks, Vmware, Sony, Nokia, Accenture, Cap Gemini, IBM, HP, TCS, Infosys, Wipro, Mindtree and others. Many students pursue higher studies in Indian and foreign universities, while some of them have setup their own ventures.

Overall, the department provides a very positive and nurturing environment, for students to develop and grow into knowledgeable, skilled and productive Electronics and Communication Engineers.

The department of Electronics and Communication is accredited by the National Board of Accreditation (NBA). The field of electronics and communication engineering is one that offers a whole new world of exciting challenges and opportunities. To automate or to interact with any device or a system, electronics plays the key role. Whether it is planetary mission or remote sensing, smart-city or self-driving cars, robots or smart mobiles or internet of things, electronics and communication is at the core.

The electronics and communication engineering department at New Horizon College of Engineering has a vision to create high quality engineering professionals who can transform society and earn global reputation. The department consists of highly qualified faculty members with rich experience both in academics, research, and industry. Apart from regular faculty, technology experts from reputed organization like IBM, HP, Texas Instruments, Sankalp Semiconductors, Audience Communication, Intel, ISRO, IISc. and other institutes visit the ECE department to interact with students and run industry-relevant technology courses.

The department has interactive classrooms and laboratories with latest equipment for students to experiment. The department also offers the VTU research center for Ph.D. and M.Sc. (Engg.), for research. Various workshops, seminars, competitive events, conferences and industrial visits for our students are also organized on a regular basis.

The Electronics and Communication Engineering Program with its autonomous status is re-designed to meet the needs of industry. The courses focus on Embedded Systems, Communication, VLSI, Signal Processing, and Information technologies. The students of ECE department execute various projects throughout their studies, publish research papers, and participate in national and international conferences. They also plan and execute various activities through Electronics Hobby Club, Technology Sharing Club, and Professional Connect club, as well as participate in cultural, sports