



Volume 1

ECE News & Events

March 2016

From Management's Desk.....*The Management congratulates department of ECE for releasing the first edition of the monthly newsletter NEXUS. Over the years, the department has shown success in academics and co-curricular activities. The institute hopes to receive laurels from the students of ECE in various fields. On the behalf of Management, I extend my best wishes to the faculty and students.*

Sh. Rakesh Tayal

From Director's Desk.....*It gives immense pleasure to flag off the first edition of the newsletter 'NEXUS' by ECE Dept for the month of February 2016. I applaud the staff and students for their achievements which shall be articulated through the newsletter. Congratulations to the Head of Department for initiating this intellectual activity. I extend best wishes and motivation to the faculty and students for the coming academic session.*

Prof. (Dr.) K.K. Paliwal

From HOD's Desk.....*It is a matter of proud to unfurl 'NEXUS' as the monthly newsletter of the ECE Department. As a mentor and head of the team, I owe thanks to the qualified and dedicated faculty for inspiring and guiding the students each day. Equally appreciable are the enthusiastic efforts of the students to learn and grow. May 'NEXUS' reach out and inspire the students.*

Mrs. Swati Gupta

Our Vision:

To be known as the Institute for science, technology, management and research globally, which has a transformative impact on the society.

Our Mission:

PIET's mission is to provide widely recognized leadership in the improvement of teaching and learning, thereby educating our students with the knowledge, skills and creativity to manage our nation's enterprise competently and confidently.

EDITORS: Mrs. Anupma Gupta, Assistant Professor, ECE Dept., PIET

Mrs. Navjot Kaur, Assistant Professor, ECE Dept., PIET

DEPARTMENT ACTIVITIES

WORKSHOP ON ROBOTICS

A two day workshop 'VISION ROBOTICS' was organized in the department from 4th-5th March,2016 under the aegis of 7th Edition of **ROBOTRYST: International Robotics Championship in Tryst 2016**, the Annual Technical Festival of IIT Delhi.



This workshop included the practical sessions on 'Installation of Software and Debugging' using **Robosapiens 'AVR BOOT Flasher v1.0 Beta'** and assembly of **DIY kit of Robosapiens iBOT Mini V3.0** for the development of **Laser controlled line following robot**. A sample kit was provided which was useful during workshop hours. By the end of this workshop every student was able to create a line follower robot by themselves.

After the hands on and practical experience of the workshop, Zonal Round Competition was conducted for the participants. On behalf of **Robosapiens Technologies Pvt. Ltd.** Certificate of Merit was distributed to the Zonal Round winners and to the participants. Zonal winners represented the college in a competition **ROBOTRYST 2016** organized by IIT Delhi .

INDUSTRIAL VISIT

Industrial visit was conducted on the eve of National Science Day Celebrations on 29 Feb, 2016 at **Central Scientific Instruments Organization (CSIO) Chandigarh**. CSIO is a constituent unit of Council of Scientific & Industrial Research (CSIR), a premier national laboratory dedicated to research, design and development of scientific and industrial instruments. The main objective of this visit was to make students aware about the new research and technologies in Electronics and give them a feel of technocrats.

CSIO is a multi-disciplinary organization having well equipped laboratories manned by highly qualified and well trained staff with infrastructural facilities in the areas of Medical Instrumentation and Prosthetic Devices; Optics and Cockpit based Instrumentation; Fiber/Laser Optics based Sensors & Instrumentation; Analytical Instrumentation; Advanced Materials based Transducers etc. Large number of instruments ranging from simple to highly sophisticated ones, have been designed and developed by the Institute.

It is rightly said that 'See & Know' is better than 'read & Learn'. Students have got real feel of technical working environment. This will help students to understand subject matter clearly.



PARENTS FACULTY INTERACTION PROGRAMME

The faculty members from ECE Department visited parents of students enrolled in B.Tech at their homes. The purpose of this meeting was to make the parents understand the academic progress of their children in a better manner. The overwhelming smiles of the parents were a mark of confidence instilled by them in the courses taught by the institute. The faculty keenly took a note of the concerns expressed by both parents and students. These interactions proved to be a successful communication bridge.



CAMPUS PLACEMENT



**Harman
Singh**

Godrej & Boyce

5.5 LPA



**Saurabh
Dawra**

Godrej & Boyce

5.5 LPA



Rajat Kamra

Godrej & Boyce

5.5 LPA



**Durr-E-
Shahwar**

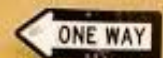
Absas & Solution

3.0 LPA

DECIDE.
COMMIT.
SUCCEED.

Success doesn't come to you,
YOU GO TO IT.

Marva Collins



FACULTY ACHIEVEMENT

Heartiest congratulations to Dr. ParveenSingla for receiving Ph.D degree on the topic "Performance Investigations on WCDMA Networks" from PTU, Jalandhar.

TECHNICAL ARTICLE

5G MOBILE COMMUNICATION

With the deployment of 4G systems for telecommunication, the researchers are looking forward to explore the benefits of 5G Mobile Generation technology.

A number of universities have set up research units dedicated to explore the benefits and challenges of 5G cellular systems. Many of the technologies used in 4G cellular systems will be incorporated into the 5G cellular systems in addition to new and advanced features.

For the mobile operators to invest in a new system such as 5G, it must provide significant gains over the previous generation systems. 5G is aimed to provide far better coverage and high levels of connectivity. 5G will need to address issues such as poor coverage, dropped calls and low performance at cell edges.

5G SPECIFICATIONS:

Typical parameters for 5G may include:

Parameter	Suggested Performance
Network Capacity	10000 times the capacity of current network
Peak Data Rate	10 Gbps
Cell edge data rate	100 Mbps
Latency	<1 ms

These parameters are still to be accepted and notified by the standardized research bodies.

RESEARCH AREAS:

- **Duplex methods:** Currently systems use either frequency division duplex, FDD or time division duplex, TDD. New possibilities are opening up for 5G including flexible duplex, where the time or frequencies allocated are variable according to the load in either direction or a new scheme called division free duplex or single channel full duplex.
- **Massive MIMO:** Although MIMO is being used in many applications from LTE to Wifi etc., the number of antennas is fairly limited. Using microwave frequencies opens up the possibility of using many tens of antennas on a single equipment because of the antenna sizes and spacing in terms of a wavelength.

Dense networks: Reducing the size of cells provides a much more overall effective use of the available spectrum. Techniques to ensure that small cells in the macro-network deployed as femtocells can operate satisfactorily are required.

- **Millimeter-Wave technologies:** The use of much higher frequencies in the frequency spectrum provides the possibility of having a much wider channel bandwidth – about 1-2 GHz. For 5G, frequencies above 50 GHz are considered which will pose serious challenges in designing the appropriate circuits.
- **Future PHY/MAC:** The new physical layer and MAC presents a number of new possibilities:
 - **Waveforms:** One new area of interest is the new waveforms. OFDM has been used successfully in 4G LTE as well as other high data rate systems but it has certain limitations. The proposed formats are: GFDM, Generalised Frequency Division Multiplexing, FBMC, Filter Bank Multi Carrier, UFMC, Universal Filter Multicarrier. For 5G, adaptive schemes may be employed and hence will provide more flexibility.
 - **Multiple access schemes:**
A variety of new access schemes are being investigated for 5G technology. These include OFDMA, SCMA, NOMA, PDMA, MUSA and IDMA.
 - **Modulation scheme:**
While PSK and Quadrature Amplitude Modulation have shown excellent performance in terms of spectral efficiency, resilience and capacity, these have the major drawback of high peak to average power ratio. The proposed modulation scheme is APSK.

The deployment of a wireless communication technology takes many years since the time of investigation of the initial stage of the technology. As far as 5G of mobile telecommunication is concerned, its investigation is going on at a steady and fast pace, and hence in the years to come there shall be reliable and timely deployment of the 5G communication systems. It is predicted that 5G technology shall come to fruition around the year 2020.

Mrs. Navjot Kaur

(Assistant Professor, ECE Dept.)

