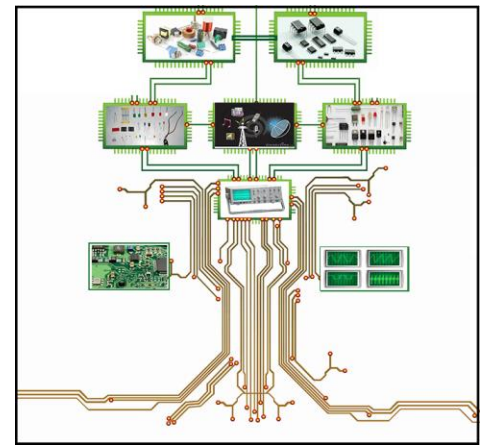


ELECTRONICA

Department of Electronics & Communication
Engineering



Volume 2

Issue 2

May 2017

Vision and Mission of the Institute

Vision

To be one of the premier Institutes of Engineering and Management education in the country.

Mission

- To provide Engineering and Management education that meets the needs of human resources in the country.
- To develop leadership qualities, team spirit and concern for environment in students.

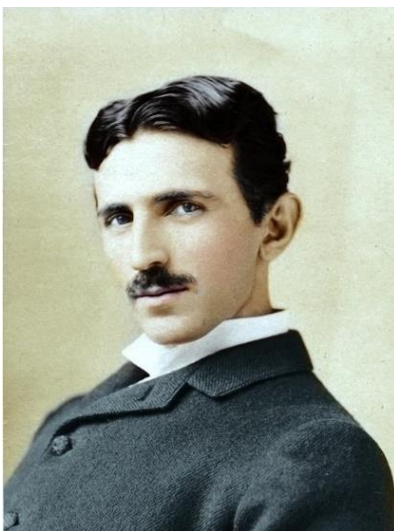
Vision and Mission of the Department

Vision

To be a renowned department for education in Electronics and Communication Engineering in Karnataka State, moulding students into professional engineers.

Mission

- To provide teaching - learning process in Electronics and Communication Engineering that will make students competitive and innovative to adapt to needs of industry and higher learning.
- To imbibe professional ethics, team spirit and leadership qualities to succeed in changing technological world.
- To inculcate empathy for societal needs and concern for environment in engineering design and practice.



“The history of science shows that theories are perishable. With every new truth that is revealed we get a better understanding of nature and our conceptions and our views are modified.”

-Nikola Tesla

Inventor, Engineer, Physicist and Futurist.

What's inside...

- *About the Department*
- *Articles*
- *Department Events*
- *Crossword*
- *Students' and Staff Achievements*

and more.....



B.N.M. Institute of Technology

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Widya Saratham Ashram

P.O: 7087, 27th Cross, 12th Main Road, Banashankari 2nd Stage, Bengaluru- 560070

FROM THE EDITOR'S DESK

Dear Readers,

We are back with yet another issue of ELECTRONICA, newsletter of Department of Electronics and Communication Engineering, BNMIT. Though, the events of high importance kept us all busy but we are never too far away, to reach out to our readers.

Carrying forward our agenda of information clubbed with various events, activities, achievements and inspirations from the staff and the students, this edition features variety of articles and soft features. My experience throughout the making of this news letter was at its best and I am truly delighted for having done this. I have tried to capture the last 6 months of excitement and activities. It is the efficiency of our students and staff that so many activities of different flavours keep taking place and yet the schedules and daily routines doesn't get disturbed. In fact on surface it is all so calm while a strong current of activity flows underneath. I hope that this newsletter encourages many more students to use it as a platform to express their creativity and make an interesting read.

I hope you enjoy going through the newsletter and will also send us your opinions and suggestions to improve it further.

Best Regards,

N.SREE SAI KIRAN

ABOUT THE DEPARTMENT

The Department of Electronics and Communication Engineering started in the Year 2001. Currently, the department is headed by Dr. P.A.Vijaya. The Department has 2 programs; B.E and M.Tech (VLSI design and Embedded Systems), affiliated to VTU.

The Department has a team of highly qualified and dedicated staff with teaching, research and industrial experience. Well-equipped laboratories with State-of-the-art infrastructure and class rooms with LCD projectors provide enhanced learning environment to cater to the budding engineers of tomorrow. The Department has a VTU recognized Research Centre and currently there are fourteen registered candidates who are pursuing for doctoral degrees.

Academic performances of the students are excellent with twelve university ranks. Students do innovative projects, internship training in industries and academic projects in reputed organisations. Students regularly participate in inter-college and intra-college technical, cultural & sports events and have regularly brought laurels to the department.

Dr. P.A.VIJAYA
HOD, DEPT. OF ECE



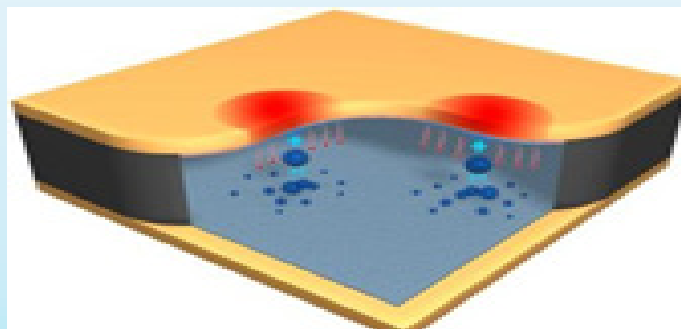
Shri. Narayan Rao R. Maanay receiving “Best Educationist” award by The Hindu Newspaper from Hon.Higher Education Minister of Karnataka Sri.Basavaraj Rayareddi in the presence of Dr. M.P. Poonia, Vice-Chairman, AICTE and Dr. M.S. Shamasundar, Advisor, NAAC at Bangalore on 26th March 2017.

BNM Institute of Technology is one among 16 engineering colleges in Karnataka to be ranked 100 - 150 by National Institute Ranking Framework (NIRF), Ministry of Human Resource Development, New Delhi, for the year 2017.

JUMPING DROPLETS

The major challenge in designing any electronic circuit is to avoid the problems due to heating. This problem arises because any electronic gadget at the bottom level depends on the behaviour of electrons. As a matter of fact there exists resistance which is an opposition to flow of electrons (current). This resistance contributes for the heat energy to be released. There are techniques to control heating problem, such as heat spreaders and composite substrate, use of thermal interface material which involves carbon nanotubes. In case of PCB's, use of more layers of ground or power plane. Thermoelectric coolers used in energy harvesting and mainly in cooling electronic devices.

Recently new technologies have been developed based on the concept of jumping droplets by engineers at Duke University and Intel to cool the hotspots in high performance electronics. The technique used by them is based on simple physics, there will be reduction in the surface area when water droplets merge and this causes the release of small amount of energy. When this combination is done with a surface that repels water i.e., a hydrophobic surface, the released energy due to this is sufficient to make the merged droplet to jump off from the surface. The representation of jumping droplets in electronics is shown in the following figure.



This technology uses a vapor chamber made of super hydrophobic floor consisting of a sponge like ceiling. When an operating electronics is placed, beneath the emerging hotspots, moisture trapped in the ceiling vaporizes. This vapor which escapes towards the floor takes away the heat from the electronics along with it.

The passive cooling structures present in the floor of the device, take away the heat causing the water vapor to condense into droplets. As these droplets merge, as stated earlier they jump off from the hydrophobic floor go back to the ceiling beneath the hotspot and the whole process repeats. This technique happens to be independent of the gravity and orientation of the device.

Advantages of jumping droplet technology over other cooling technology

This technology has a mechanism which is in built for vertical heat escape which is a major advantage over the existing heat spreading technology which concentrates on dissipating heat in a single plane. Existing technology like thermoelectric coolers cannot target random hotspot locations which makes them inefficient to be used in larger areas. Though there exists techniques to target moving hotspots, they require extra power inputs which make them inefficient.

Challenges faced in jumping droplet technology and future work to be done

As stated by one of the contributors of this technology, jumping droplet addresses the technological void with vertical spreading of heat mechanism. Since this technology is new, much work has to be done in order to find a proper material which can work with high heat vapor in the long term.

Sources and references:

<http://www.pelonistechnologies.com/blog/four-ways-to-cool-compact-electronic-devices>.

<http://www.engineersaustralia.org.au/News/jumping-droplets-cool-down-powerful-electronics>

<http://www.sciencedirect.com/science/article/pii/S1369702105709354>

APPLIED PHYSICS LETTERS 110, 141601 (2017), "Hotspot cooling with jumping-drop vapor chambers", Kris F. Wiedenheft, H. Alex Guo, Xiaopeng Qu, Jonathan B. Boreyko, Fangjie Liu, Kungang Zhang, Feras Eid, Arnab Choudhury, Zhihua Li, and Chuan-Hua Chen

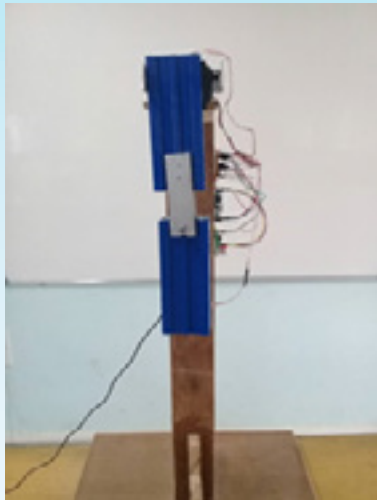
Akhila K, VI ECE A

GESTURE CONTROLLED ROBOTIC ARM FOR THE AMPUTEES

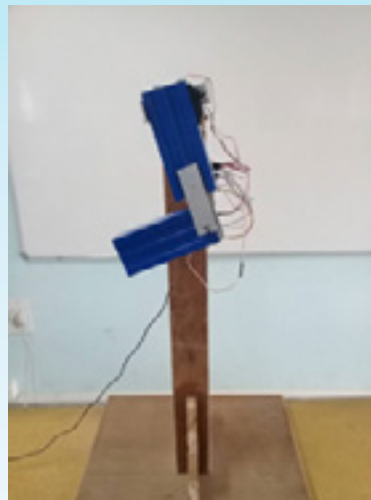
Surveys show that 1.8% of India's total population are Arm Amputees (Approx 24 Lakhs). Out of which 60% are from Rural Background. Bionic hands prove really costly to these people due to the technology involved. So, these people choose to remain an Amputee for life rather than investing on an Artificial limb.

Here, we have built a Robotic Arm, which will be installed where the person has lost his arm. Now using his other arm, which is still intact, the actions of the Robotic Arm is controlled. The idea is to mimic all the actions of a Human Arm. It is operated on a wireless platform, which eliminates wires running on the body. When the Flex Sensor is bent, the resistance of the strip decreases and this analog value is fed to an Arduino Uno, which performs ADC conversion. The set of digital data is then encoded at the RF encoder and transmitted. At the receiver, the RF decoder performs decoding operation and provides the digital data to the second Arduino Uno, which generates the PWM signal to drive the servo motors. We have used 3 servos, two at the shoulder and one at the elbow. Currently we provide the power supply to the Arduino from the AC mains via an Adaptor

The implementation is as shown below.



REST POSITION



ELBOW MOVEMENT



SHOULDER MOVEMENT

The Robotic Arm has been developed successfully and the movements can be controlled precisely. This Robotic Arm control method has fulfilled nearly all the movements that are possible through a human hand.

Further modifications include, the installation of fingers, the usage of Carbon Fibers, which give a human hand type look. Carbon fibers is lighter by nearly 50% compared to the currently used extrusion material. Reduction in weight means lesser current is required to operate the servo, there by facilitating the usage of batteries for the servo motor control. Another modification would be the usage of muscle sensors, which picks up the pulses sent by the brain and ensures Robotic Arm is controlled independently, rather than using the human hand to control the same.

Tejaswini V, Shishira, Tejas, Shuvankar, VI ECE B

WHY WE NEED WOMEN ENGINEERS

Science and engineering have been evolving all the time. History of science and engineering gives many examples of pioneering works by many scientists and engineers which have completely changed the lifestyle of human race. However culture and traditions worldwide have been differently aiding (?) the growth perspective by its own practices. In many of the countries, Science and Engineering education is given highest priority by governments. However, girls have little scope to develop their skills as engineers. This is in reference to gender ratios. If the expected gender ratio is 50:50 for every hundred in population, ratio of educated to uneducated has fallen to 98:2. According to studies, the world average of youth educated is 89.6% in 2010. There is a wide gender disparity in the literacy rate in India: effective literacy rates (age 7 and above) in 2011 were 82.14% for men and 65.46% for women. When it comes to Engineering, the difference widens even further. Following are the data given by Women in Engineering Society which needs an immediate action plans.

- The proportion of young women studying engineering and physics has remained virtually static since 2012.
- In 2013/14, women accounted for only 3.8% of engineering apprenticeship starts and 1.7% of Construction Skills starts.

The other aspect which is of major concern is that many women engineers opt out of engineering and chose a different field of growth. Women and men engineering and technology students express similar levels of intent to work in engineering & technology, but 66.2% of the men and 47.4% of the women graduates in 2011 went on to work in engineering and technology. This disparity can be due to many reasons, but in most of the countries it is due to beliefs of society and work domains where women and girls are treated differently at workforce.

Evolution of mankind will be incomplete due to innovations of science and technology unless and until all sections of the society are not equally involved or benefitted by them. According to survey, Diversity matters: companies are 15% more likely to perform better if they are gender diverse. Also diversity is crucial for innovation

In a global survey, 85% corporate diversity and talent leaders agree that “A diverse and inclusive workforce is crucial to encouraging different perspectives and ideas that drive innovation.” It is as good as saying we need women engineers as we need women doctors. Further the GDP growth improves to a greater extent. It is estimated that enabling women to meet their full potential in work could add as much as \$28 trillion to annual GDP in 2025.

Many organizations and individuals have realized this difference in growth of society and have been encouraging women in engineers to be successful in their careers. Dr. Anita Borg (1949-2003) was one of them and Anita Borg Institute was one such organization. She had a unique capacity to mix technical expertise and fearless vision that inspired, motivated and moved women to embrace technology instead of fearing or ignoring it. The Grace Hopper Celebration of Women in Computing is the world’s largest gathering of women technologists. It is produced by the Anita Borg Institute and presented in partnership with ACM.

In view of overall growth that benefits every individual of the human race and if we consider technology innovation is a strategic imperative, there is need to connect and inspire women in engineering.

Prabhavathi P, Associate Professor, Dept. of ECE.

Department Events

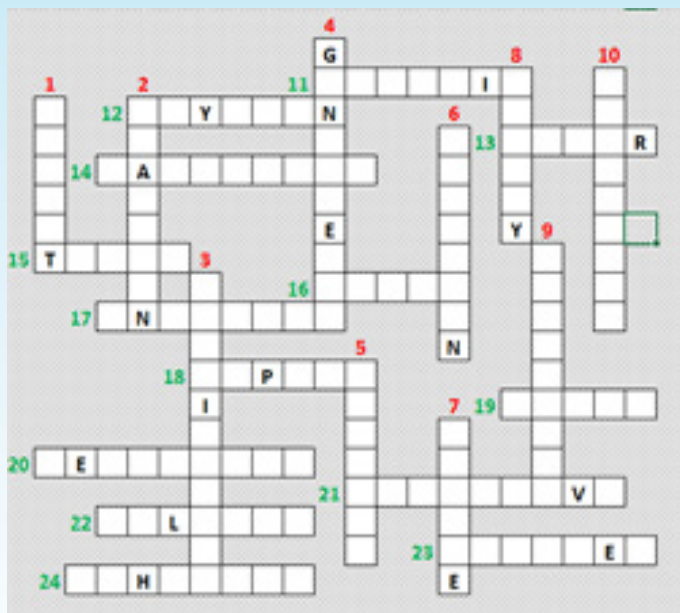


Felicitation to Prof. D.N.Krishna Kumar on 31st May 2017



Students exhibiting projects during department level IPL summer competition.

CROSSWORD



DOWN:

1. Having an enhancement mode and a depletion mode, I work with Voltages.
2. I proved that Lightning is Electricity, and almost died in the process.
3. The process by which solids turn into gases.
4. I measure angles, like ones on the face of crystals.
5. The first has none of me, the second has two of me, and that's how I was discovered.
6. My alter-ego is responsible for electricity. If I collide with it, gamma rays are produced.
7. Valve containing 3 electrodes inside a vacuum tube.
8. A configuration of Three Colinear Celestial bodies.
9. Boom Boom in Outer Space.
10. Boom Boom on Earth that was a radioactive disaster.

ACROSS:

- 11 Low Concentration to High Concentration.
- 12 A very eccentric physicist, he (and 2 others) won the Nobel Prize for Physics for work in Quantum Mechanics.
- 13 I am a type of Diode.
- 14 I'd be asleep in an electrical circuit because I'm passive and I store the energy.
- 15 Also having a popular American rock band named after him, this Engineer's greatest contribution to mankind is AC.
- 16 The mathematician who discovered the equation of true mathematical beauty, but few can pronounce his name right.
- 17 I'm like #14 with the opposite effect.
- 18 I am an elementary particle that obeys Fermionic Statistics.
- 19 The First Real Computer, and boy was I BIG!
- 20 You'll find me in power stations. Without me, Electrical Engineering wouldn't exist.
- 21 91.1 FM is entertaining you because we use _ .
- 22 I am everywhere. On beaches, in your garden, on fields, in your TV, speakers, everywhere.
- 23 This effect is the reason sounds are high pitch closer to you and low pitch further away.
- 24 Eka-Thallium

TANISH ISLAM, IV ECE C

ANSWERS FOR CROSSWORD

ACROSS:
 11-SMOSIS 12-FEYNMAN 13-ZENER 14-CAPACITOR 15-TESLA 16-EULER 17-INDUCTOR 18-LEPTON 19-ENIAC 20-GENERATOR 21-RADIOWAVE 22-SILICON 23-DOPPLER 24-NIHONIUM

DOWN:
 1-MOSFET 2-FRANKLIN 3-SUBLIMATION 4-GONIOMETER 5-NEUTRON 6-POSITRON 7-TRIODE 8-SYZYGY 9-SUPERNOVA 10-CHEERNOBYL

PC BASED OPHTHALMIC PERIMETER FOR VISION FIELD TESTING

The spread of visual impairment is a very sensitive issue worldwide. Visual field testing is an important tool to detect and monitor blind areas of the eye. Perimeter system is used in the ophthalmology to diagnose the field of vision. This test is important to make sure there are no abnormal blind spots in the person's visual field. The word 'ophthalmic' relates to 'eye and its diseases', and 'perimeter' is the 'device used for peripheral vision testing'.

Ophthalmic instruments are designed to measure and evaluate the visual field within which stimuli projected on a curved surface will produce the sensation of sight with the eyes in a straight-ahead position. These devices can determine the central and peripheral visual field and, usually, the areas of lost or depressed vision. The determination basically establishes separately each eye's capability to see test objects. Ophthalmic perimeters may use mobile or fixed targets of fixed luminosity. The results are usually recorded for each eye. These perimeters are used to detect and evaluate pathologies that cause constriction of the peripheral vision or that affect both peripheral and central vision. Manual and automated ophthalmic perimeters are available. Manual Ophthalmic perimeters that perform peripheral visual assessment with operator involvement in all the steps of each test.



This project was awarded a cash prize of Rs.2000 at SRISHTI 2017, a State Level Engineering Students' project exhibition and competition held during 26th - 28th May 2017, conducted by ABVP at RVCE, Bangalore

We have developed an experimental prototype of perimeter system that is controlled by software module. The software module is integrated into a PIC microcontroller and is interfaced using a 16*2 LCD. The patient rests his chin on the chin rest and stares at the predefined constantly illuminated red spot at the centre of hemisphere. During examination, the patient receives small flashes from 64 LED-s that are arranged in a matrix in the hemisphere module. If the patient observes the flash from the LED sources, he acknowledges this by pushing the response button. These responses are recorded by the system and tabulated to give the appropriate results. The results are displayed for each spot number accordingly, Half Vision, Full Vision, Logic Fail and Blind.

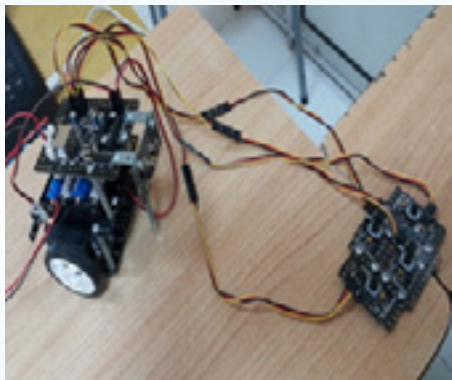
STHUTHIE V MURTHY, NAGASHRUTHI M S, POOJA G R, HARSHITHA P D, VIII ECE B

SMART CAR FOR THE PHYSICALLY CHALLENGED

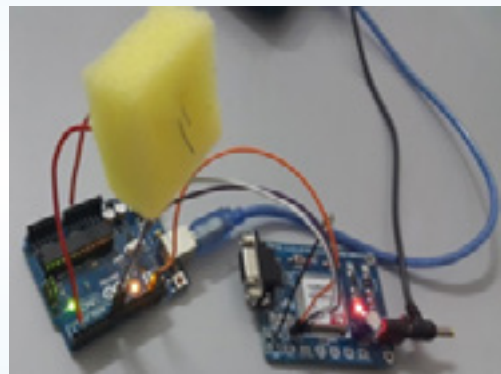
A UNIQUE ADDITION TO THE IOT

When engineers can bring about marvellous results for the welfare of humanity, why not take an extra step for the physically challenged? According to a recent study by the WHO, more than a billion people in the world today experience disability. “The Smart Car for the Physically Challenged” aims at eliminating the major clause of dependency faced by the disabled.

Robotics has become an essential part in every professional field existing today. The smart systems and automated mechanisms are related closely. Some of the characteristics of smart systems are: sensors for signal acquisition, components transmitting diverse decisions and instructions, units to command and control based on the available information. The smart car is one such application where the disabled person operates the car by himself without worrying about the obstacles that might come across or those that have missed his sight. The concept is based on the use of sensors for direction control and automatic sensing of the presence of any obstruction nearing it, Thus, alerting the driver in the form of a buzzer and LED. The smart car is also equipped with a separate GSM and pressure sensor based Arduino safety alert system. This alerts the caretaker as soon as the driver sits inside the car through a text message. The smart car ensures complete safety of the driver on seat and helps him to move about independently.



Smart car for the Physically Challenged



The safety alert system of the smart car

The major advantage of this car is that there is no emission of any harmful substance thus making this an eco-friendly option. The entire smart car consists of very little complex structure making it less bulky. The smart car does not have any external wire circuitry, thus preventing any danger for the user. The text message is sent instantly. This action helps alert the responsible person and facilitates him to take measures for his safety. More than one mobile number can be stored in the Arduino program which facilitates different caretakers to receive the message at the same time.

Most of the technology seen today is dependent on automated systems. Moreover, eco-friendly systems are in need. Scientists and researchers are working upon technologies to eliminate the vehicles and mechanisms that harm the environment in any way. This sums up to the smart car's future scope.

STUDENT'S ACHIEVEMENTS

- **Madhuri Kaushik B J** of 8th Sem won 1st place and Gold medal in Classical Vocal (Solo) at 17th VTU Youth Festival, Yuva Kalanjali, organized by Sir MVIT, Bangalore during 16th -19th March 2017.
- **Ganesh Murthy** of 4th Sem won 1st place and Gold medal in Percussion at 17th VTU Youth Festival, Yuva Kalanjali, organized by Sir MVIT, Bangalore during 16th -19th March 2017.
- **Abilasha Bharadwaj** of 8th Sem won 2nd place in One act play at 17th VTU Youth Festival, Yuva Kalanjali, organized by Sir MVIT, Bangalore during 16th -19th March 2017.
- **Ashish B** of 8th Sem presented a paper titled “Temperature Monitored IoT based smart incubator”, at I-SMAC 2017 organized by SCADIT, Palladam, TN during 10th -11th Feb 2017
- **S Shruthi** of 8th Sem presented a paper titled “Proactive Routing Protocols in a MANET – A Review”, at I-SMAC 2017 organized by SCADIT, Palladam, TN during 10th -11th Feb 2017
- **Sana Anaum** of 6th Sem presented a paper titled “Smart car for the physically challenged, A unique addition of the internet of things”, at I-SMAC 2017 organized by SCADIT, Palladam, TN during 10th -11th Feb 2017
- **Ganesh Ram S S** of 8th Sem presented a paper titled “A Kalman filter approach for spectral data pre-processing”, at IEEE ICECCT 2017 organized by SVSCE, Coimbatore, TN, 22nd -24th Feb 2017
- **Vishakha Murari, Suhas N Bhargav & Zeeshan Saquib** of 6th Sem presented a paper titled, “Blind-Dar: An Invisible Eye for the Blind People”, in RTEICT-2017 organized by SVCE, 19th -20th May 2017
- **Tejashwini V, Shishira, Tejas & Shuvankar** of 6th Sem won Best project award at semester level for “Gesture Controlled Robotic Arm” during IPL Summer competition 2017.
- **M. S. Nagashruthi** of 8th sem ECE and **Bindu G.B** of 4th sem M.Tech (VLSI & ES) were awarded as the Best Outgoing Students for the year 2016-17.
- Out of 42 final year projects, four project groups and seven students were awarded with the Best Project and Best Presenter awards respectively.

UNIVERSITY RANK HOLDERS (2015-16)



BINDHYA SHREE V
2nd RANK, BE



BHAGYALAXMI D. SOMAYAJI
6th RANK, BE



SARAH IRAM L INDIKAR
3rd RANK, M.Tech (VLSI & ES)

STAFF ACHIEVEMENTS

- Prof. Bindu S & Dr. M.S.Suresh published a paper titled “Electric field induced resistance change in PEDOT-PSS films”, in British journal of applied science & technology, science domain international in May 2017.
- Mrs.Chaitra N & Dr.P.A.Vijaya published a paper titled, “Comparing Univalent and Bivalent Brain Functional Connectivity Measures Using Machine Learning”, at ICSCN 2017, MIT, Anna University, Chennai.
- Kiran S M published a paper titled “High security data hiding in videos using multi-frame, image cropping and LSB algorithm”, in Vol 3, Issue 3 of IJARIT, May 2017.

DEPARTMENT EVENTS



Dignitaries inaugurating FDP on “Physical Design Challenges in DSM Node VLSI System” on 16th Jan,2017



Hands on session during FDP on “Physical Design Challenges in DSM Node VLSI System”



Participants of FDP on “Physical Design Challenges in DSM Node VLSI System”, conducted during 16th -21st Jan, 2017



One day Industrial visit to BEL, Bangalore as a part of Faculty development program.



Best project award of Rs.5000/- was awarded to Tejaswini V, Shishira, Tejas & Shuvankar of 6th Sem during IPL- 2017.



Best final year project for ECE was awarded to K. Saikruthi & Anvitha S Kumar during IPL- 2017.



Department level final year Project Exhibition organized under IEEE-BNMIT Student Branch.



Department level final year project exhibition award winners from 8th semester A & B sections.

EDITORIAL TEAM

CHIEF EDITOR

Dr. P.A.Vijaya, HOD, Dept. of ECE.

FACULTY MEMBERS

- Mrs. PADMAJA JAIN
- Mrs. CHAITRA. N

STUDENTS

- N.SREE SAI KIRAN, VIII ECE B
- STHUTHIE V MURTHY, VIII ECE B
- SANA ANAUM, VI ECE B
- RAKSHITH B V , IV ECE C
- PRAJVAL A M, VI ECE A
- TANISH ISLAM, IV ECE C