



ZEAL INSTITUTES

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NARHE | PUNE | INDIA

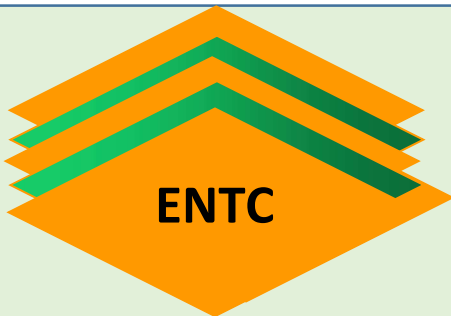
Re-defining Excellence



***ELECTRONICS AND TELECOMMUNICATION
ENGINEERING***

SPECTRUM

2K20-21



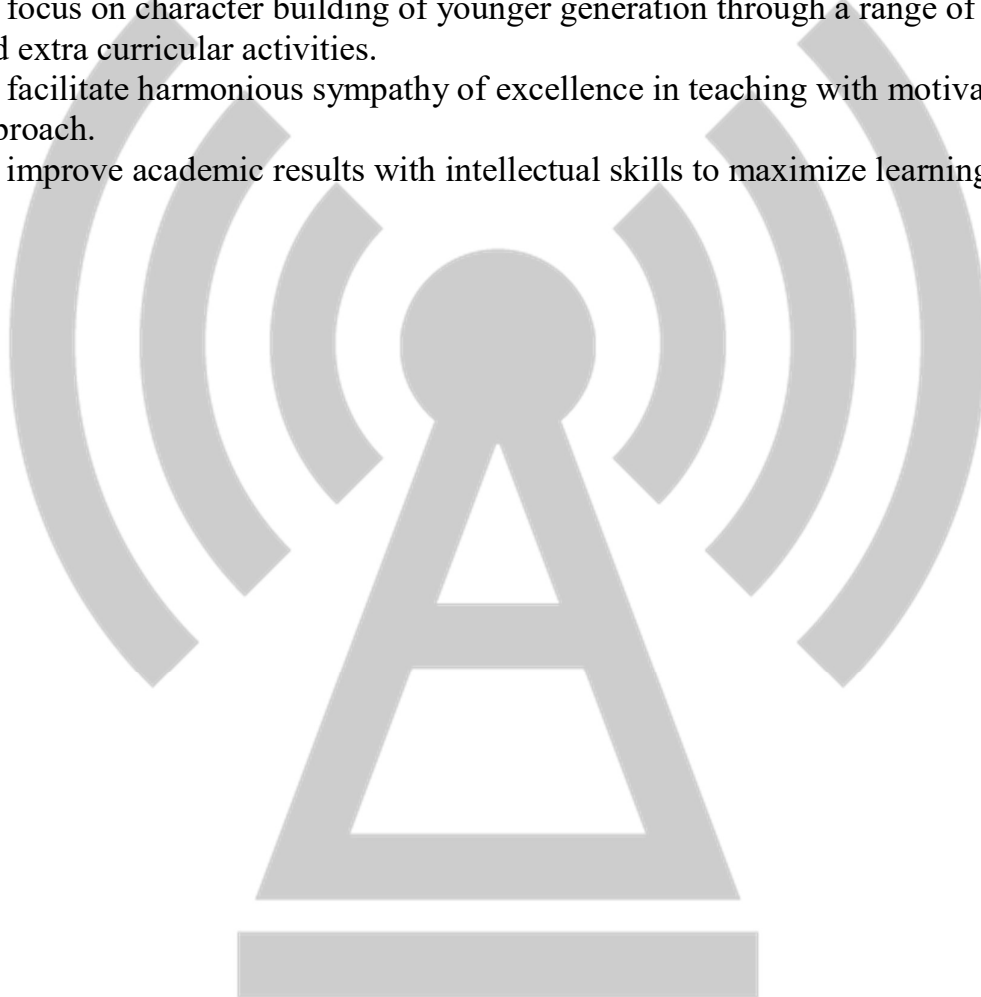
“To impart holistic Education in Electronics and Telecommunication Engineering to create engineers equipped to meet the challenges of a dynamic, global environment”

Institute:**Vision**

“Transforming dreams into reality by developing an individual’s potential through spread of knowledge and wisdom in healthy environment,”

Mission

1. To provide value based education to help the zealous students to structure their career to the glorious future.
2. To focus on character building of younger generation through a range of curricular and extra curricular activities.
3. To facilitate harmonious sympathy of excellence in teaching with motivational approach.
4. To improve academic results with intellectual skills to maximize learning.



Department:

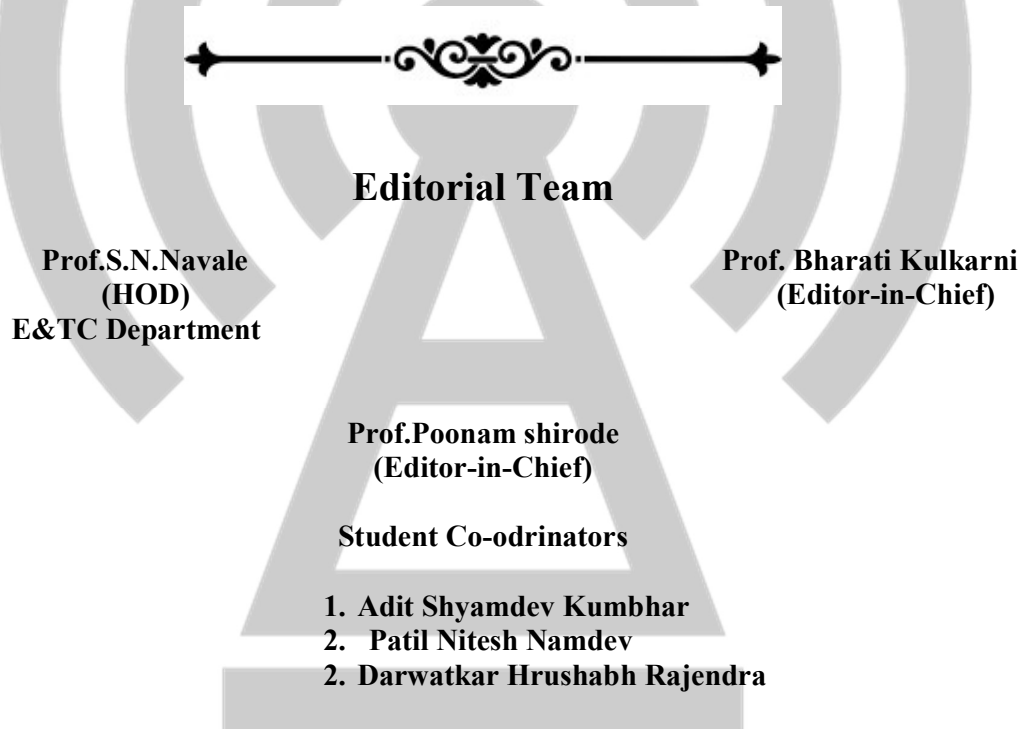
Vision

“ To develop Electronic and Telecommunication Engineering graduates with excellent academics, knowledge, leadership skills & ethics.”

Mission

Department of Electronic and Telecommunication Engineering is committed to achieve our vision by:

- M1. Imparting quality education in the field of electronics and telecommunication engineering to meet various needs.
- M2. Providing ethical and outcome based education for overall development of graduates.
- M3. Indicating creative thinking through innovative and extra-curricular activities to enhance the leadership skills and employability or higher education.



FOUNDER DIRECTOR'S MESSAGE



I believe that diploma education provides hands on experience to students. Therefore as an entrepreneur, I insisted my three sons to take admission in polytechnic before going to higher education in mechanical engineering.

At zeal polytechnic, we are committed to creating an ambience for nurturing innovation, creativity and excellence in our students. We aim to prepare young engineer entrepreneurs and managers. They will have the competence and confidence to face all challenges. It is possible only when we impart high quality technical and managerial education coupled with appropriate training and wide exposure to the state of art practices.

This newsletter lays emphasis on all round personality development and also on inculcating human values and professional ethics. It helps our students become more human and socially responsible beings to lead a meaningful life. I wish a very knowledgeable, healthy and prosperous life to all.

Hon. Shri. S. M. Katkar
Founder Director,
Zeal Education Society, Pune.

PRINCIPAL'S MESSAGE



We provide best platforms to budding engineers to acquire technical knowledge, motor skills and soft skills which are utmost demands of the industry. Uniqueness of our institute is a caring, nurturing culture that recognizes the various aspects of each student and encourages them to bloom to their fullest with confidence.

We are also committed to very good quality of teaching-learning process with having maintained high grade discipline among the staff and students and to achieve sky-scraping point superiority in academic by maintaining a conducive atmosphere for studies, state-of art laboratories communication center and digital library. MOUs have been signed with reputed organization to impart cutting edge technologies through extensive courses.

In another view, we aim at development of our student at different levels by the proper encouragement, guidance, support and generation of in-house recourses for sports, cultural, yoga, meditation etc followed by giving them a confidence to feel free at home.

These efforts have resulted in more placements and we are keen to argument it further. We are quite self-assured for the molding and nurturing of our students as a young, bright, dynamic, talented & professional technocrats and a responsible gentle citizen by raising the our actions to at high quality technical education.

Prof. A.A.TAMBOLI
Principal, Zeal Polytechnic
Zeal Education Society, Pune.

HEAD OF DEPARTMENT (H.O.D.) MESSAGE



The Department of Electronics & Telecommunication has a strong team of faculty members who grace the department with their extensive teaching experience and industrial exposure to the department. The department offers excellent facilities in terms of modern equipment and instruments to the students.

Faculty members pay special attention to all the students for their curricular and co-curricular development. The department aims providing excellent theoretical and practical knowledge which helps the students in the academic growth.

The department organises various industrial visits offer practical exposure of the industry to the students. To add a feather to our hat, MSBTE has awarded an 'Excellent' grade during external monitoring.

Prof. S.N.NAVALE
H.O.D

VIRTUAL REALITY



Virtual Reality (VR) is simulated experience that can be similar to or completely different from the real world. Currently standard VR systems use either VR headsets or multi-projected environments to generate realistic images, sounds, and other sensations that simulate a user's physical presence in a virtual environment. Applications of VR can include entertainment and educational purposes. A person using VR equipment is able to look around the artificial world, move around in it, and interact with virtual features or items. Other, distinct types of VR-style technology include augmented reality and mixed reality. The term "virtual" has been used in the computer sense of "not physically existing but made to appear by software".



Software used in VR:

Virtual Reality Modeling Language (VRML), first introduced in 1994, was introduced for the development of "Virtual World" without dependency on headsets. Web-VR is an experimental Java script Application Programming

Interface (API) that provides support for various VR devices, such as the HTC Vive, Oculus Rift, Google Cardboard or OSVR, in a web browser.

Hardware used in VR:

Modern VR headset displays are based on technology developed for smart phones including: gyroscopes and motion sensors for tracking head, hand and body position; screens for stereoscopic displays and small, lightweight and fast computer processor.

Methods of VR:

- Simulation-based VR: Driving Simulator is an example for this type. It gives a driver onboard experience of actual driving of an actual driver by predicting vehicle motion caused by driver input and feeding back corresponding visual, motion and audio cues to the driver.
- Projector-based VR: in projector-based VR, modeling of the real environment places a vital role in various VR applications, such as robot navigation, construction modeling and airplane simulation.
- Head-mounted display (HMD): A HMD more fully immerses the user in a virtual world. A VR headset ideally includes two small high resolution OLED or LCD monitors which provide separate images for each eye for stereoscopic graphics rendering a 3D virtual world, a binaural audio system, rational and positional real time head tracking for six degrees of movements.
- Avatar-image based VR (AIBVR): With AIBVR, people can join the virtual environment in the form of real video as well as an avatar. One can participate in 3D distributed virtual environment as form as either a conventional avatar or a real video.
- Desktop-base VR: Desktop-based VR involves displaying a 3D virtual world on a regular desktop display without use of any specialized positional tracking equipment.



Types of VR:

Augmented Reality (AR): AR is a type of VR technology that blends what the user sees in their real surrounding with digital contents generated by computer

software. The additional software generated images with the virtual sense typically enhance how the real surrounding looks in some way. AR systems layer virtual information over a camera live feed into headsets or smart glasses or through a mobile device giving the user the ability to view 3D images. Mixed Reality (MR): MR is a merging of the real world and virtual world to produce new environments and visualisations where physical and digital objects co-exist and interact in real time.

Applications of VR:

- VR is most commonly used in entertainment applications such as video games and 3D cinemas. Consumer VR headsets were first released by video game companies in the early-mid 1990.
- 3D cinemas have been used for sporting events, fine art, music videos and short films.
- In social science and psychology, virtual reality offers a cost-effective tool to study and replicate interactions in controlled environment.



Author

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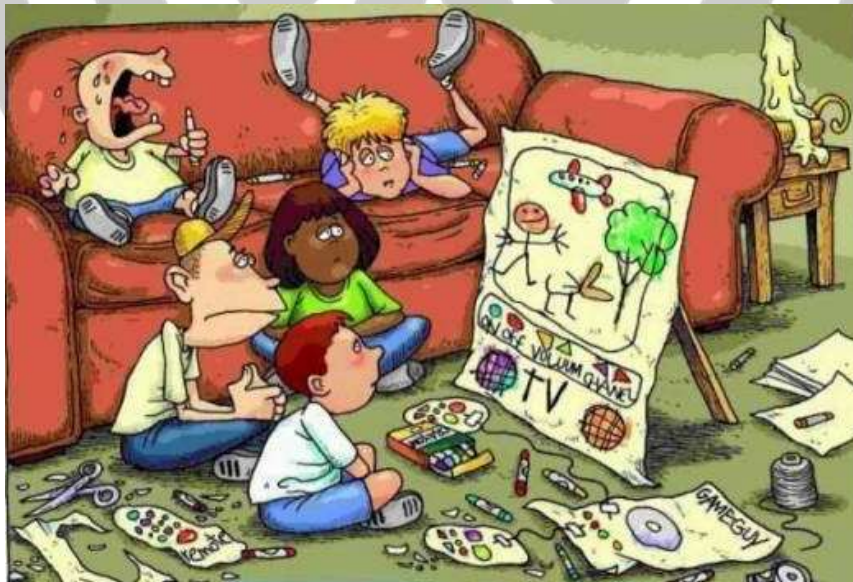
IMAGINING A LIFE WITHOUT ELECTRONICS AND COMMUNICATION ENGINEERS

Can we imagine our daily life without the electronic devices like mobile phone, laptop television, tablets, digital watch, internet banking, ATM cards, WI-FI, internet connection, microwave oven and much more.

NO WE CANNOT!!!!

All this is possible due to E&C Engineers.

Imagine that one fine day where you decided to be an electronics and communication engineer. Your interest towards innovation made you attract towards this field making your career. The demand for new electronics products in the market and the speedy research in this field makes ECE a better choice for once carrier in engineering.



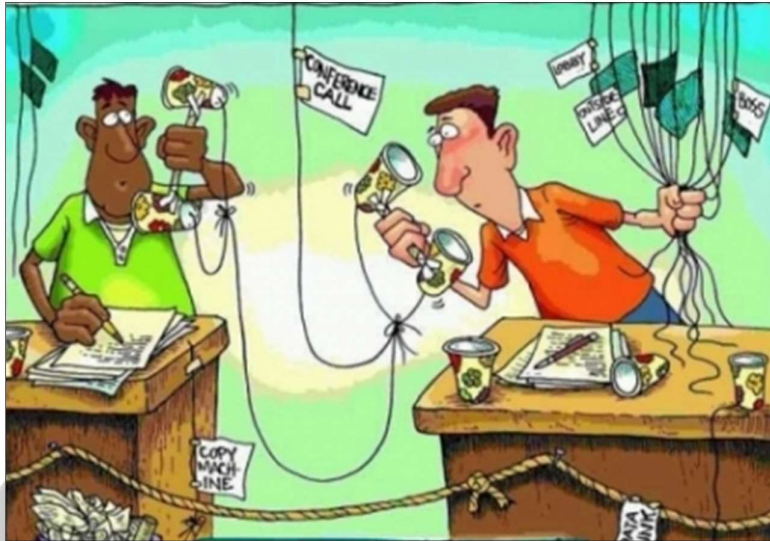
ECE has been helped in various different fields as mentioned below:

INFANT MORTALITY RATE: Care monitor device was developed to reduce sudden infant death syndrome.

DISASTER RELIEF: These are some of the most inspiring inventions created to help survivors endure such calamity like flat-pack refugee shelters, radiation – detecting watch, solar powered, inflatable led light etc.

SPACE COMMUNICATION: Our activities in space is also increasing to be advanced in space communication, our communication system has to be very much advanced which is only possible through potential E&C engineers. This is also a very interesting field as many students have fantasies to do something in the field of space.





HUMANOID ROBOTS: In future humanoid robots are replacing persons work and making future much easier and simpler. Sooner all these gadgets are going to be a part of our lives. The best thing with ECE is that Robotic engineering is progressing with the introduction of butler bots which help in reducing human work remarkably.

All this makes ECE an interesting field. There is ample growth in the field of electronics and communication engineering, schemes like start up India fund the young professionals looking forward to be an entrepreneur in the digital world, by 2020 it will grow as one of the booming sectors in India.

In the next few decades there will be many revolutions in field of ECE as transparent smartphones is expected to be launched. On the other hand advancement in artificial intelligence has been taking the communication to next level where you can interact with the device and they respond your way.

For all this a student must have strong technical knowledge, great experience at a practical level, very good industrial exposure and perseverance. By all these the world will grow in leaps and bounds, there is no denying in this fact.

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AUTONOMOUS UNMANNED AERIAL VEHICLE FOR EMERGENCY BLOOD DELIVERY

Increase in population has given rise to many problems, one such problem is lack of availability of blood in an emergency to the victim. It is a merely impossible to deliver blood on time due to heavy conjunction in traffic, lack of storage facilities and bad roads.



There are only 2903 blood banks across India. The count of blood banks is less than 3 for 10,00,000 people. So there is a need for faster delivery methods of blood. The usage of autonomous drones for this purpose is very efficient. The term Autonomous flight is used when pilots command is not used to fly an aircraft. Usually this mode is helpful for long flights. Autonomous flights can be achieved by having a flight controller like Pixhawk, APM on board along with these listed components given below.





Hybrid VTOL UAV: Hybrid UAVs combine vertical take-off and landing capability with the forward propulsion of a fixed wing UAV. In many hybrid VTOL UAVs, motors are incorporated into the aircraft's wings, which then transition for forward flight. These UAVs can be easily operated in cities as they do not require any runway for take-off and landing.

Mission planner: Mission Planner is a ground control station and calibration software for Plane, Copter and Rover. Using mission planner we can give the way points to the aircraft and also monitor the status of aircraft using this ground station.

Pixhawk 2.1: The Pixhawk 2.1 is a flexible autopilot intended primarily for manufacturers of commercial systems. It has 32 bit ARM cortex M4 processor with 14 PWM / Servo outputs and UART, I2C, CAN interface.

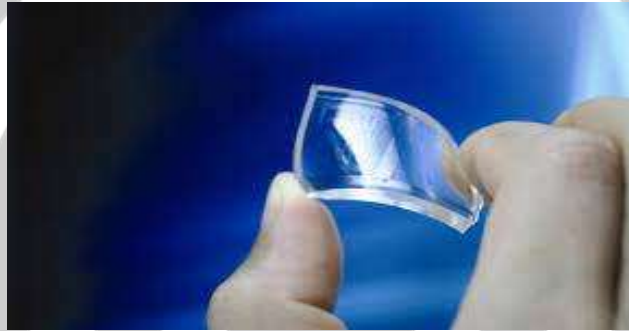
GPS: The Global Positioning System (GPS) is a network of about 30 satellites orbiting the Earth at an altitude of 20,000 km. The GPS module connects to the nearby satellites. Precision of the GPS increases with the number of satellites connected. And a minimum of 5 satellites has to be connected for an autonomous flight.

Telemetry: Telemetry is a device that gives all the information about the orientation and any errors in the controller. It is a must for any autonomous flight. We can track the position of the aircraft by using a telemetry system. A telemetry module is connected to both the ground station and the aircraft and both the modules can act as transmitter and receiver at the same time.

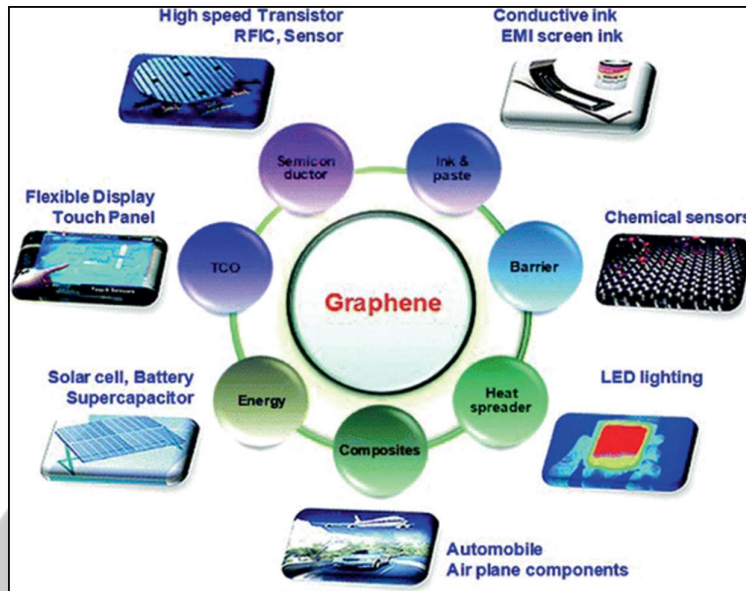
Fabricating an UAV with these components can be used to comfortably deliver up to 1 litre of blood package and travel a distance of 50km in less than 30 minutes and can become a lifesaver for a person in emergency.

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GRAPHENE



With the rapid advancement in the field of electronics, size, speed and flexibility have become the most important aspects. With the existing technology, we have to compromise with any one of these aspects. The only way to not compromise with these three aspects is by using graphene. Graphene is an allotrope of carbon in the form of a single layer of atom in 2- Dimensional Hexagonal lattice in which one atom forms each vertex. Graphene is so small that it is considered the world's first 2-D crystal. It was discovered by Russian born scientists Andre Geim and Kostya Novoselov in 2004 and they won the Nobel Prize for their discovery in 2010. Graphene has very high conduction capability because of its electron mobility. The mobility of electrons is 100 times faster than silicon and its heat conduction is also two times better than diamond. Graphene possesses electrical conductivity about 13 times better than copper. Graphene is harder than diamond and also more elastic than rubber. It is one of the strongest known materials if not the strongest material and also it is tougher than steel and yet lighter than aluminum



Graphene has the potential to create the electronics materials which are now considered as science fiction. Graphene might find its place in almost all engineering fields. Because of its conductivity it can be used as superconducting material, solar cells, transparent conducting electrode. In biomedical application graphene can be used for improved drug delivery and it can also be used in cancer treatment. It can be used in flexible displays, efficient solar panels, bulletproof vest as it can absorb twice as much impact as Kevlar which is normally used in bullet proof vests. Coming to aerospace industry, graphene can be used in space propulsion due to its lightweight and strong interaction with light. One day it might find its place in supercomputer. The only problem with graphene is that, it is not easy to produce in large quantities at a decent quality and it costs about 100 dollars to 200 dollars per gram.

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Online Technical Rangoli Competition conducted by E&TC Department on Engineer's Day:

