NIRMA UNIVERSITY
INSTITUTE OF TECHNOLOGY
NAAC ACCREDITED 'A' GRADE

SPECTRUM

Volume 3 | Issue 1
July - December 2021

Department of Electronics and Communication Engineering
Institute of Technology, Nirma University
Ahmedabad-382481

Vision of the Department

To lead in developing cutting-edge knowledge & technology and producing globally competent professionals in Electronics and Communication Engineering

Mission of the Department

To shape technically competent, analytical, Creative and problem solving Electronics and Communication Engineers capable of meeting Industry challenges and social needs

To foster a conducive environment For multidisciplinary research and innovation

To encourage faculty and students to achieve Excellence in the profession and to grow as ethical and socially responsible leaders

Preface

Mr. Viraj Mankad

On the campus of Institute of Technology, Nirma University, the Department of Electronics and Communication Engineering is one of the most vibrant departments. Various events and activities organized by the ECE Department and the Electronics and Communication Students' Organisation (ECO) club, showcases the dedication and commitment of the department towards the betterment of the student community. The idea of peer-to-peer learning with collaboration of theoretical and practical knowledge, enhances the qualities of share and learn in an engineer. To have a platform where students and faculties can express their views, share achievements, and the department can share their efforts to develop teaching – learning process, is the Department Newsletter cum Student Magazine "SPECTRUM".

The Department of Electronics and Communication Engineering and the Team ECO 2021, happily present the First Issue of the Third Volume of "SPECTRUM". This issue covers different activities organized and witnessed by the department from July 2021 to December 2021. This issue has different articles by students and faculties. Along with academic learning, the students of the ECE Department are talented in various fields, and it can be viewed in the sections: Students' Achievements and ECs' Got Talent. The Department of Electronics & Communication Engineering is taking many initiatives to involve alumni in strengthening the department activities. Alumni Articles are always a topic of getting important industrial tips from the voice of alumni. Alumni Sponsored Lab is also a major part of this issue. The department puts in lots of efforts to promote research activities among students and faculties, and so, the Publications at the ECE Department are listed with details, in this issue. The department and ECO club organized various activities involving technical and cultural areas, which are also described with glimpses. The abstracts of the students who completed their Ph.D. degree can also be found. The EC Department organizes various events every semester or on a regular basis, which can be called as the flagship events, are provided in a special section called Best Practices at EC Department. As the batch of 2018-22 will be passing out soon, and to give a glimpse of their offline cum online journey in B. Tech EC, this issue contains a special section of some photographs of this batch, captured on various occasions.

We are sure that the forthcoming students, will take forward the legacy of this informative and innovative magazine.

On behalf of the Team ECO:

Mr.Viraj Mankad (Roll No.: 18BEC052)

Department of Electronics and Communication Engineering,

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Voice of Alumni

Opportunities for EC Engineers in the Post COVID World

It is not the strongest of the species that survives, nor the most intelligent; it is the one most adaptable to change.

– Charles Darwin

Mr. Bibhav Singh
(2017 Batch Passout)

India has been one of the strongest developing economies in recent past with a booming service sector. It achieved Y-o-Y GDP growth of 4% in 2019 and was well on track to continue the momentum in 2020. Suddenly, the world was hit by arguably the worst pandemic in the documented history, causing the stock markets to crash around 30% and impacting large and small businesses alike with strict lockdowns enforced globally.

Corporates didn't have a choice but to rethink their employee and technology strategy to keep their shops open for business, and as they say change is the only constant. Industries were compelled to unanimously switch - to remote ways of working overnight.

Going digital overnight needed the right supply chain in place ranging from semi-conductors that goes into chips to network infrastructure providing capable and secure access to information and further high-speed information sharing with near-zero latency to enable real-time applications include health monitoring, telematics, critical plant monitoring etc. The biggest gainer of this move has undoubtedly been IT, Electronics and Communications companies in last one year.

Remote working has forced organizations to move from the conventional client-server model to cloud computing infrastructure which offers greater flexibility and scalability. This put pressure on Communication Service Providers (e.g., *Vodafone, AT&T, Jio*) to scale up their speeds by enable newer technologies like 5G and LEO Satellite Communication (e.g., *Starlink, Kuiper*), Telecom Equipment Manufacturers (e.g., *VMware, Cisco, Huawei etc.*) to keep innovating products to meet the new security and networking needs with evolution of products like SASE – Secure Access Service Edge – which is an amalgamation of Networking (e.g., *SD-WAN*) & Security products (e.g., *Firewall, SWG & ZTNA*) to meet the incoming needs.

This shift has been a revolutionary one disrupting supply chains globally. The IT stocks worldwide have seen an unprecedented rise but at the same time demands for semi-conductors have gone through the roof, with companies failing to meet their demand orders and that's where an opportunity lies for India to be that manufacturing hub. India is looking to be the semiconductor superpower in near future with interests coming in from global players like Intel and government, rolling out incentive scheme worth roughly $10 billion to attract international semiconductor which would create thousands of jobs for EC engineers.

Voice of Alumni

Speaking of workforce, with 'Work-From-Home' kicking in, barriers to switch jobs have reduced dramatically – leading to the 'Great Resignation' globally with attrition rates going as high as 30% in IT industry, and competent talent with relevant skills getting as much as 2x/3xof their current salary to continue working from the same place – just using a newly shipped laptop. This makes the EC and Tech space much more lucrative for prospective tech- savvy aspirants who look forward to build the future of tech.

Given the context and evolution, it can be said with a high degree of confidence that if you're invested in understanding and building the engineering behind electronics and communication technologies in 2020s, you're in the right place at the right time.

Strategically speaking, it's interesting to note that tech companies have telco products on their roadmap and telco companies have tech ones. Content providers including Google, Facebook, Amazon owns a major pie of under-sea cables, which should ideally fall within the telco portfolio – but we can't ignore the fact that Facebook, now known as Meta would require near zero latency to enable the Metaverse and its real-time applications and use cases, so better own the infrastructure and have a skin in the game. At the same time, telco majors like Vodafone and Lumen are placing their bets on creating a marketplace and going the tech route for growth.

What's going to change in future? We can't answer that as we haven't seen the future. New use cases and technology products come over time and create demand of their own. For example, we didn't know we would need Uber, UPI, Cloud Infrastructure or even iPhone!

But we can answer what's not going to change. Customer would want things to be faster and easier to use, and next set of innovations will come in all things IT and EC.

On a parting note, the engineering curriculum needs to keep pace with the evolving industry landscape and trends. There is a need to bring in industry, product and customer perspective to build products or services that ultimately enhance the quality of human life through sustainable business models. Currently defined curriculum provides a thorough understanding of the product and its underlying technology, but more needs to be done on packaging it in a compelling and sellable manner. Irrespective of the technology, unless there is a compelling value proposition to the underlying technology – or a customer problem that is solved, customers won't buy it. In other words, there needs to be a convincing story that conveys to the customer as to why he/she should buy it. This is one skill which should be cultivated along with other technical skills during the undergraduate programme.

As an engineer we shouldn't shy away from performing our own research to build products or understand the market better. Building a new product is fine but we should go one step further to package it in a way it sells. It helps us to get a more holistic picture of what we are building and if it will solve an actual customer problem at the given price-point.

Times of using technology are gone, we now live technology.

Voice of Alumni

About the Author:

Mr. Bibhav Singh is a strategy consultant with Monitor Deloitte in Telecom, Media and Technology sector. He is an alumnus of Institute of Technology, Nirma University (2017) after which he pursued MBA from Symbiosis Institute of Business Management, Pune (2019) and worked with Vodafone Group as a digital transformation consultant for Europe and African market for two years.

Voice of Faculty

Hybrid RF-Optical Communication: Applications and Challenges

Prof. Hardik Joshi
Assistant Professor, EC

Multimedia and IoT applications are increasing and creating a massive demand for data, user density to the last mile user. The current RF, Microwave or millimeter links use a 3 kHz to 300 GHz spectrum. Limitations of RF communication are the limited available bandwidth, licensed spectrum, and suffering from interferences. The Optical Wireless Communication (OWC) can provide huge bandwidth communication to end-user with less cost, less power, and more security with no electromagnetic interferences.

Due to the rapid progress in Opto-electronics and electro-optic equipment, the OWC has become a promising solution. The most promising OWC technologies are Visible Light Communication (VLC), LiFi, optical camera communication (OCC), and free-space optical (FSO) communication. However, the OWC has limitations like the requirement of Line of Sight alignment, less Coverage, blockage due to wall, Interference by light, can be affected by Outdoor atmosphere, and power limited. However, due to the compliment behavior of RF and Optical link in different atmospheric scenarios, we can use hybrid RF and Optical technology, which can overcome the limitations of RF communication and have the advantage of both technologies.

The trending hybrid approaches can be either RF/Optical hybrid links like RF/FSO, RF/VLC, WiFi/LiFi, BLE/OCC, WIFI/OCC, or Optical/Optical hybrid links like VLC/FSO, LiFI/OCC, and FSO/OCC. In the case of underwater communication, the acoustic/optical can have the benefit of both technologies. These technologies can be helpful in different scenarios like indoor communication, vehicle communication, localization, underwater communication, and electronic health.

Possible Applications and Advantages

Voice of Faculty

Indoor Links: At public places like shopping malls, the Wi-Fi networks are very congested and cannot provide guaranteed QoS. In such cases, the hybrid WiFi/VLC, WIFi/LiFi can be helpful by diverting huge traffic over VLC or LiFi. Due to the presence of two links, the overall link reliability is improved. Remote patient monitoring the hybrid OCC/Bluetooth network can improve performance.

Backhaul Connectivity: The RF/FSO or MM wave/FSO link can replace RF-based network, mm-wave link, or microwave link for backhaul connectivity.

Underwater connectivity: Looking at underwater communication situations like LOS/Non-LOS, range, low data rate, the RF/FSO, acoustics/FSO links can improve data rate and link reliability.

V2X Communication: In-Vehicle to Vehicle or Vehicle to Infrastructure communication, the RF/OCC and RF/FSO link can improve reliability. For vehicle localization/Positioning/navigation, RF/OCC links can establish reliable communication.

Challenges

Network Selection: Due to the mixture of available wireless and optical technologies in heterogeneous networks, Network selection is a significant issue in hybrid links. The optimal network selection depends on various environmental factors and lighting.

Access Protocol: Because of LOS requirements and low range, the Mobility support is poor in most optical networks like VLC, LiFi, and FSO. The CSMA-CA-like media access protocols need to be designed for hybrid links.

Heterogeneous Receiver: The receiver consists of both optical and RF receivers, and both have different characterizes. When both receivers are simultaneously working, combining or transmitting RF and Optical signals together is a critical issue.

Handover: The random movement of the user changes the property of the optical channel. The existing protocols used in RF links and Optical links are different, which makes mobility management in hybrid links more challenging. Load balancing and user allocations in the optical link is serious problem due to the movement of users.

High capacity Backhaul Network: The high capacity backhaul network must carry the large amount of data produced by a hybrid access network.

Courtesy:

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Voice of Faculty

Underwater Wireless Communication

Prof. Rachna Sharma
Assistant Professor, EC

Underwater wireless communication is the transmission of data over wireless carriers in an unguided aquatic environment. The increased exploitation of natural resources underwater, particularly in the sea, has sparked a slew of technological breakthroughs in fields such as environmental monitoring, oil and gas exploration, and warfare, to name a few. Underwater wireless communications play a vital role in all of these fields, with available systems relying on radiofrequency, optical, and acoustic transmissions. Due to the low attenuation of acoustic waves underwater, acoustic wireless communications have traditionally been the most popular alternative. They are, however, inherently bandwidth constrained, with significant temporal lag and hefty antennas. Underwater wireless communication can also use electromagnetic induction and radio frequency bandwidth – intensive electromagnetic waves. However, in conductive seawater, the bandwidth and link distance that may be achieved are still fairly limited, especially due to antenna size constraints. As a specific band of electromagnetic radiation, light has the potential to transform the way we communicate underwater.

Underwater optical communication (UWOC) has piqued the interest of both academic and industrial sectors in recent years because of its advantages of substantial bandwidth, good security, small footprint, and low temporal delay. UWOC is a complimentary underwater wireless communication technique to the more established acoustic lines, and it offers numerous exciting prospects for a number of short – range bandwidth – intensive applications. With a basic understanding of the UWOC channel, one may develop appropriate transmitters, receivers, signal processing algorithms, and networking strategies for various applications. Finally, testing platforms should be carefully built in order to collect reliable experimental data.

New Initiative: Alumni Sponsored Lab

Setting up Alumni Sponsored CV-ML-Robotics Laboratory

The Department of Electronics and Communication Engineering under the Institute of Technology, Nirma University has completed twenty-five years of its existence. The Department has a wide alumni network spread globally. The alumni are extensively contributing to the Department by way of providing their services as members of different committees, examiners, delivering lectures as resource persons, providing mentoring/guidance to the existing students, writing articles for the Department magazine, student placement for summer/winter internship, etc. During the Silver Jubilee Celebrations of the Institute of Technology and later many meetings were held with the different groups of alumni. In different interactions, alumni have suggested to set-up a full-fledged Alumni Sponsored Laboratory. Several alumni have shown a willingness to sponsor some hardware and software for such a laboratory. The preliminary work for setting-up the laboratory has been initiated under the guidance of Dr. Dhaval Pujara, Professor and Head, Department of ECE, Institute of Technology, Nirma University.

Funded Research Project @ the Department

Design and Development of Fabry Perot Cavity based Feed Cluster

Title of the Research Proposal: Design and Development of Fabry Perot Cavity based Feed Cluster

Project Duration: 2 Years

Principal Investigator: Dr. Dhaval Pujara, Professor and Head, Department of ECE, Institute of Technology, Nirma University, Ahmedabad

Funding Agency: Indian Space Research Organization (ISRO)

Project Summary:

Horn antennas are extensively used as feed to reflector antennas for various space applications such as global coverage, telemetry, tracking and control, and as feed clusters for Multiple Beam Antennas (MBAs). One of the prime requirements for all such applications is to have high gain from the feed horn. The conventional way to increase the gain of the antenna is by increasing the aperture of the horn. However, in the case of space applications, there is always a space constraint and it may not be possible to increase the gain by increasing the aperture dimensions of the horn. In such situations, some innovative technique may be thought of to increase the gain of the horn antenna without increasing the aperture diameter and compromising with the RF performance. The proposed research includes design, analysis and realization of a PRS based feed cluster (septet) with high gain.

Completion of Ph.D. @ the Department

Name of Student: Mr. Ankit Adesara (Roll No.: 14EXTPHDE131)

Name of Guide: Dr. Amisha Naik

Thesis Title: Design and Implementation of a Low Noise Low Power Biopotential Amplifier for Biomedical Applications

Abstract: The continuous real-time monitoring of diverse physical parameters using bio-signals like ECG and EEG requires the bio-medical sensors for capturing those signals. Such a sensor consists of an analog front-end unit for which operational trans-conductance amplifier (OTA) is essential block. Along with noise and power, the parameters like CMRR, input impedance, DC offset and output ripple must be taken in to consideration while designing as they equally affects the overall performance of amplifier.

In this work, the novel chopper-stabilized bio-potential amplifier is proposed. The chopper stabilization technique is used to reduce the offset and flicker noise. Further, the OTA is equipped with a additional block to enhance the input impedance without consuming extra power. In addition to this, the ripple reduction technique is employed at the output branch of the trans-conductance amplifier. The designed amplifier can be used for various applications like portable devices, wearable electronics and healthcare devices.

The major challenge while designing was to maintain the balance in performance in terms of noise and power due to the existence of a trade-offs between them. The specifications have been carefully chosen after detailed study of ECG and EEG recording systems for the bio-potential amplifier as it processes very low amplitude and frequency bio-signals, Not only that the Layout design was very crucial due to issues of matching of various devices as it also affects overall circuit performance.

The designed amplifier consumes 5.5 _W strength with the mid-band gain of 40dB. The pass-band for the designed amplifier is 0.1Hz to 1KHz. The input impedance is likewise boosted with the proposed method up to 200M. The noise is 42 nV/ pHz with CMRR of 82 dB. All simulations are carried out in 180nm parameters.

Name of Student: Harikrishna Parmar (Roll No.: 13EXTPHDE100)

Name of Guide: Dr. Usha Mehta

Thesis Title: Power Aware Test Architecture for System-on-Chip

Abstract: VLSI industry is currently in the era where all electronic circuits necessary to complete the system are being fabricated on a single chip known as System-on-Chip (SoC). Today's SoC is composed of large number of Intellectual Property (IP) cores with diverse nature. With the advances in fabrication process for IC, the manufacturing cost has reduced significantly and now the testing cost is becoming a dominating part of the overall cost of an IC. The testing cost is strongly related to the increasing test-data

Completion of Ph.D. @ the Department

volumes as the larger test data volume lead to longer test application times. The current methodologies for test time reduction are efficient but ever increasing test data volume needs more efficient test time reduction methodologies. Generally, the efforts for test time reduction cause the increase in test power. Excessive test power and test energy results in reliability issues, thermal issues and in some cases yield loss too. In this thesis, the major testing issue "Test Time" in context of "Test Power" is focused.

From various test time reduction techniques available in literature, the techniques dealing with test frequency scaling constrained by power budget and test scheduling are selected for further research. It is very natural that as the dynamic test power is proportional to test frequency, any efforts to reduce test time by increasing test frequency, cause the increase in test power and may violate the power budget.

We have considered here the dynamic scaling of frequency considering the maximum allowable test power of individual core and maximum allowable test power of entire SoC. In this thesis, we have proposed two methods: 1. Dynamic-Test-Frequency-Allocation to IP Cores of SoC (DTFA_Cores) 2. Dynamic- Test-Frequency-Allocation to Test Vectors of IP Cores (DTFA_Vectors).

In DTFA_Cores, we have reduced the test time of individual core by Dynamic Test Frequency Allocation to different Cores under the constraints of power budget of individual core. Here we are increasing or decreasing the test frequency of core based on power budget of Core and overall power budget of SoC. Further, we are applying here Integer Linear Programming for test scheduling of cores of SoC under constraints of power budget of SoC.

In DTFA_Vectors, we have applied the increase in test frequency to individual test vector which in turn reduces the scan-out & Scan-in time of test vector pair. Based on the number of transition during scan-vector pair, the frequency is up scaled under the constraint of rated average power of core. This method requires the on-chip Dynamic Test Frequency Generator (DTFG). The DTFG converts the rated test clock frequency to dynamic clock frequency. Further, as the frequency is changing at core-to-core or vector-to-vector, the test pattern is prefixed with frequency indicator.

For both proposed methods, we have shown the experimental results on widely used ISCAS benchmark circuits and ITC benchmark SoCs. We have included the results for session-less and session-based test scheduling in case of Bus-based-SoC as well as NoC-based-SoC.

The proposed methods cause a small bit overhead. So such frequency allocation scheme is evaluated on the basis of its test time reduction capability, on-chip area overhead and on-chip bit overhead (of course, the power budget should not be crossed in any case). Effectiveness of these methods are demonstrated with large amount of simulation results. The experimental results prove the effectiveness of proposed method compared to recent methods in literature.

Completion of Ph.D. @ the Department

Name of Student: **Mr.** Pratik Trivedi (Roll No.: 13EXTPHDE95)

Name of Guide: Late Dr. Tanish Zaveri and Dr. P. N. Tekwani

Thesis Title: Multiplierless Tunable Architecture for Signal Processing Transforms

Abstract: Signal processing algorithms like Discrete Fourier Transform, Discrete Cosine Transform, and Fast Fourier Transform find various applications in the field of Image processing, Wireless communication, Robotics, and many others. It covers basically three operations viz. Multiply, Shift and Accumulate. Hence if the input data goes on rising as in cases where high resolution is required the amount of multiply operations also rises significantly. For example, the number of complex multiplication operations in case of Discrete Fourier Transform is N2, where N is the number of points. Latency becomes an important issue which needs to be addressed in today's era as we, humans, thrive for the fastest systems with maximum resolution. Multiplierless techniques for this purpose has been always a research area as it helps in reduction of the later part. Multipliers bound to increase the latency especially in the algorithms which use complex multiplications, for instance to evaluate a single complex multiplications minimum four real multiplications are required. Hence, in techniques where number of such complex multiplications need to be evaluated, latency increases to an exponential amount as in case of Discrete Fourier transform. To reduce latency, we need to either emphasize on reduction in amount of data to be processed or change the processing structure which can affect the overall time to output. There are three broad techniques found in the literature for addressing this issue. Complex Multiplication techniques itself requires four real multiplication and two adders and hence it becomes practically infeasible for the case where large amount of data needs to be transformed. Coordinate rotation of digital computer (CORDIC) (Volder) based techniques are well known for the Multiplierless implementation of the sinusoids. However, it carries certain drawbacks viz. large number of iterations and accuracy. This thesis addresses the issues of Multiplierless implementation of the rotation for two different cases viz. CORDIC based techniques and Coefficient combined selection and Shift and Add implementation (CCSSI) (Garrido, Qureshi, and Gustafsson). It proposes improvement to the existing CORDIC based approach as well as CCSSI. Platform used for the implementation of the proposed approach is MATLAB. At the end the work presents a tunable multiplier less architecture for implementation of sinusoidal as well as non-sinusoidal transforms.

The thesis provides two different contributions in the field.

1) It proposes an efficient approach for the implementation of the Mixed Scaling and Rotation CORDIC (Lin and Wu) algorithm and also improves its SQNR by weighted amplifying factors.

2) The second contribution provides Coefficient combined & shift and add implementation (CCSSI) (Garrido, Qureshi, and Gustafsson) based approach to design Multiplierless rotators for various sinusoidal as well as non-sinusoidal transforms

adding case of multiple constant rotators also. A novel tunable Combined co-efficient scaling and shift and add approach is proposed which takes into the following parameters.

- Number of bits,
- Number of adders,
- Maximum allowable error
- Number of points.

The approach improves the range of coefficients with respect to number of adders (the range taken is from 2 to 10 adders), and number of bits (the range taken is from 1 to 64 bits), compared to the existing approaches. It also presents the Multiplierless architecture for the tunable parameter shown above.

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2. Asha Aditya, Ankur Pandya, “Determination of Mueller Matrix for Metal Substrates by Stokes Polarimetry”, IEEE Transactions on Instrumentation and Measurement, 2021.
3. Arpita Bhargava, Chinmay Khurana, Vijay Savani, “Stock Market Prediction using Machine Learning and GUI Development", International Conference on Emerging Trends in Engineering and Technology (ICETET), 2021.
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24. Sinha Khushboo, Yogesh N. Trivedi, "Modified Correlation Detector Based Spectrum Sensing with Laplacian Noise in Cognitive Radio”, Radioelectronics and Communications Systems.

Publications @ the Department

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29. Aravind Kannan, Atish Jain, Prem Nivas, Ruchi Gajjar, Manish I. Patel, “LSTM-Based Prediction of COVID-19 Vaccination Drive in India.” 1st IEEE International Conference on Artificial Intelligence and Machine Vision (AIMV), 2021.
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Placements @ the Department

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Deloitte Haskins ZS Associates QuinBay Technologies Qualcomm Infineon Technologies Secure Meters

nVIDIA LogiNext Solutions AMD (Xilinx) Searce Cosourcing Service Infosys Publicis Sapient Oracle

The Department of Electronics and Communication Engineering holds a consistent record for job placements in the course of B.Tech. and M.Tech. Every year, the department puts in committed efforts for placements and assures good offers from companies working in the files of core EC engineering, as well as IT field as well. The Placement Team of the department works together with the III Cell of the Nirma University, to ensure effective placement process. The faculty members also help the department in enhancing the placement drive every year. To have smooth communication between the department, companies, and the placement cell, and also to involve students to manage the placement process, the department appoints a Student Placement Coordinator, who will guide his/her peers in the placement process. The students also get good guidance from their seniors through events like Placement Mantra, in which the seniors share their experiences about the company placements. The department also focuses on project and outcome-based learning, and on this basis, students get a chance to work in prestigious research organizations or companies, on various projects, for the well-defined last semester internship. This is followed by placement with a nice package as well as the learning that the company imparts to the fresher students. Some of the prominent companies are listed on the borders of this placement page, in which the majority of the EC students are placed during the placement drive of the year 2021-22.

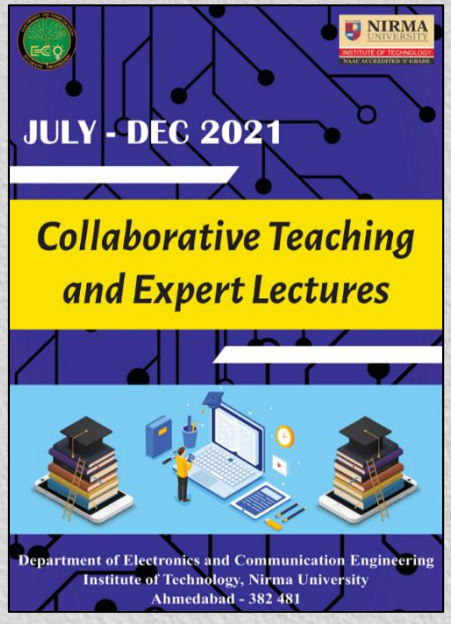
Toddle Effiya Technologies Amdocs Infor India Optum Global Solutions TCS

Best Practices of the Department

E-booklet: Collaborative Teaching and Expert Lectures

It is said that learning is the never-ending process, and the EC Department believes the same. The department arranges various expert lectures and collaborative teaching by the industry experts, Academicians from renowned Institutions and the esteemed Alumni from all over the world.

It is arranged for the entire curriculum in each semester. So, the compilation of all the expert lectures and collaborative teaching, along with informative reports and lecture glimpses is framed as an e-booklet, which is released at every 6 months, starting from the first issue of July 2021 to December 2021, during which the EC department conducted six Collaborative Teaching series and thirty Expert Lectures.



Department YouTube Channel

The Official YouTube Channel of the Department of Electronics and Communication Engineering named “Projects at the Department of ECE, Nirma University”, consists of videos and tutorials on various EC-related projects made by our brilliant students on topics like wireless smart systems, deep learning, sensor networks, IoT integration, RISC-V processors, etc.

With the help of our highly experienced professors, faculty members, Head of department, and laboratory mentors, we aim to make this channel as informative and useful as possible for students of B.Tech. EC engineering across colleges. The link to the channel is: https://www.youtube.com/channel/UCjHa7ijeUJXcuRwrOwbTwjw.

Make sure you Like, Share, Subscribe, and turn notifications on for this channel!

Best Practices of the Department

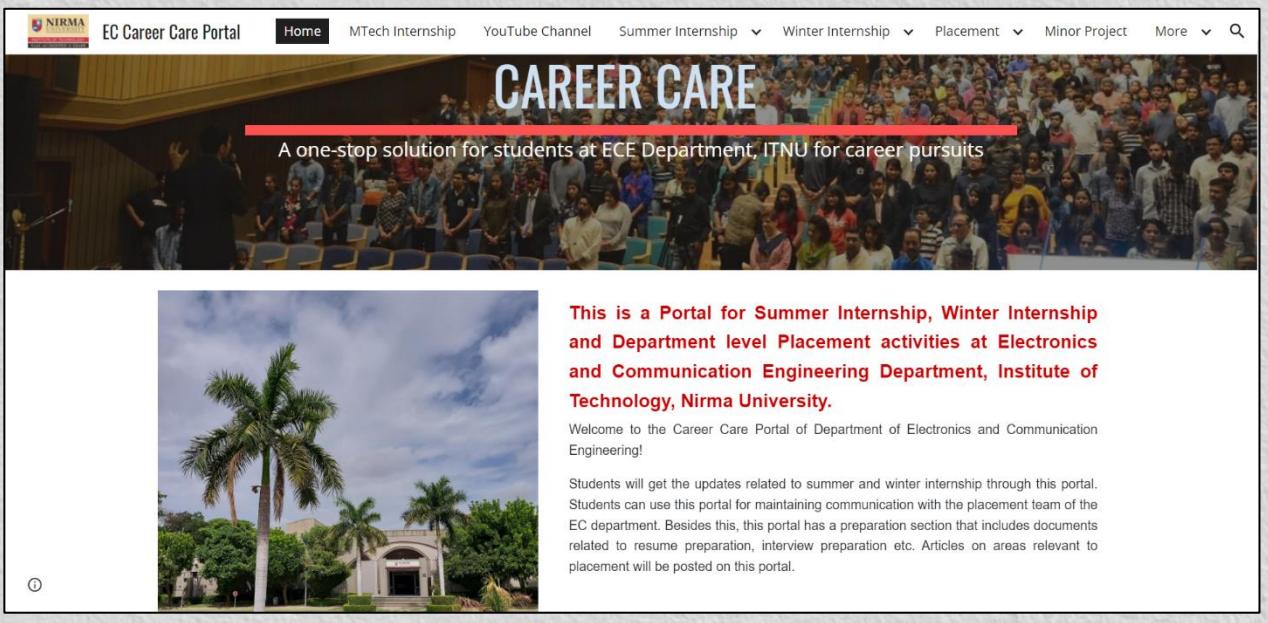
Rigorous Summer Internship Programme

In the curriculum of B.Tech. Electronics and Communication Engineering: Semester - 7, there is a course, SP701 Practical Training, wherein the students are to take training in the industry, research organization, or a renowned academic institution during their summer break. Students get opportunity to work at various companies or research institutes, with the help of the EC Department and by their own efforts as well. Student get a chance to get experience, working with eInfochips, Soleos Solar, Jekson Vision, OpenFive, Reliance Jio, Oizom Instruments, L&T, Goldman Sachs, Embee Group, NIT Rourkela and many more companies and institutes which help them in the placements ahead. There are options of on-campus and off-campus opportunities, and the EC Department helps students to approach companies and provide official recommendation also, if needed. There are in-house opportunities also, in which students can take up projects on Nirma University campus, and work under department faculty as a guide. Students working in Robocon, are allowed to work with Robocon for the summer internship, so that they can work more in their field of interest. So, by this practice of summer internship programme, the department ensures to give good industrial exposure to students and make them ready for the placements.

Career Care Portal

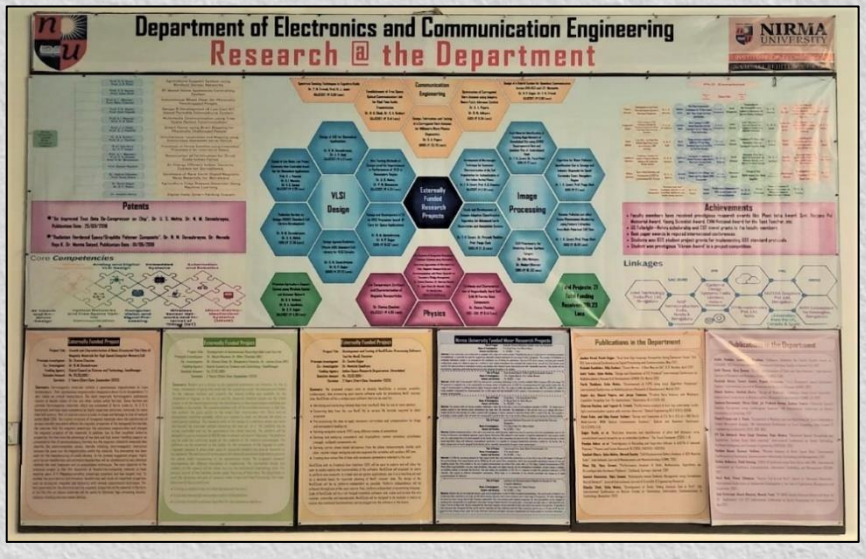
The Internship and Placement Team of the Department has developed a Portal for Summer Internship, Winter Internship and Department level Placement activities at the Department of Electronics and Communication Engineering, Institute of Technology, Nirma University. It is a one stop solution for students of EC department for their career pursuits. Students get the updates related to summer internship, winter internship and minor project through this portal. Students can use this portal for maintaining communication with the placement team of the EC department. Besides, this portal has a preparation section that includes documents related to resume preparation, interview preparation, experience sharing of students placed during the campus placement drive etc. Articles on areas relevant to placement are also posted on this portal. The FAQ section of the portal addresses all of the major student queries related to internship, projects and placements. The Alumni section has details about the alumni placed in leading companies and who have come forward to help the department with internship and placement activities.

Best Practices of the Department



The URL to access the portal is: https://sites.google.com/view/ec-careercare/home.

Department Research Wall



There is a dedicated Research wall of the EC Department, on the right, after entering D-block. The research wall showcases the treasure of research and innovation that the department has achieved and is achieving, from the efforts of faculties and students. It has flyers and details of different research activities at the department, and it shows the details of various on-going and completed funded projects. There is heavy funding from esteemed organizations like GUJCOST, ISRO, DRDO, etc., and this promotes students and faculties to involve in more and more innovative projects and research work. Also, this wall features the paper publications by the EC department students and faculties.

Best Practices of the Department

Exclusive Students' Conference

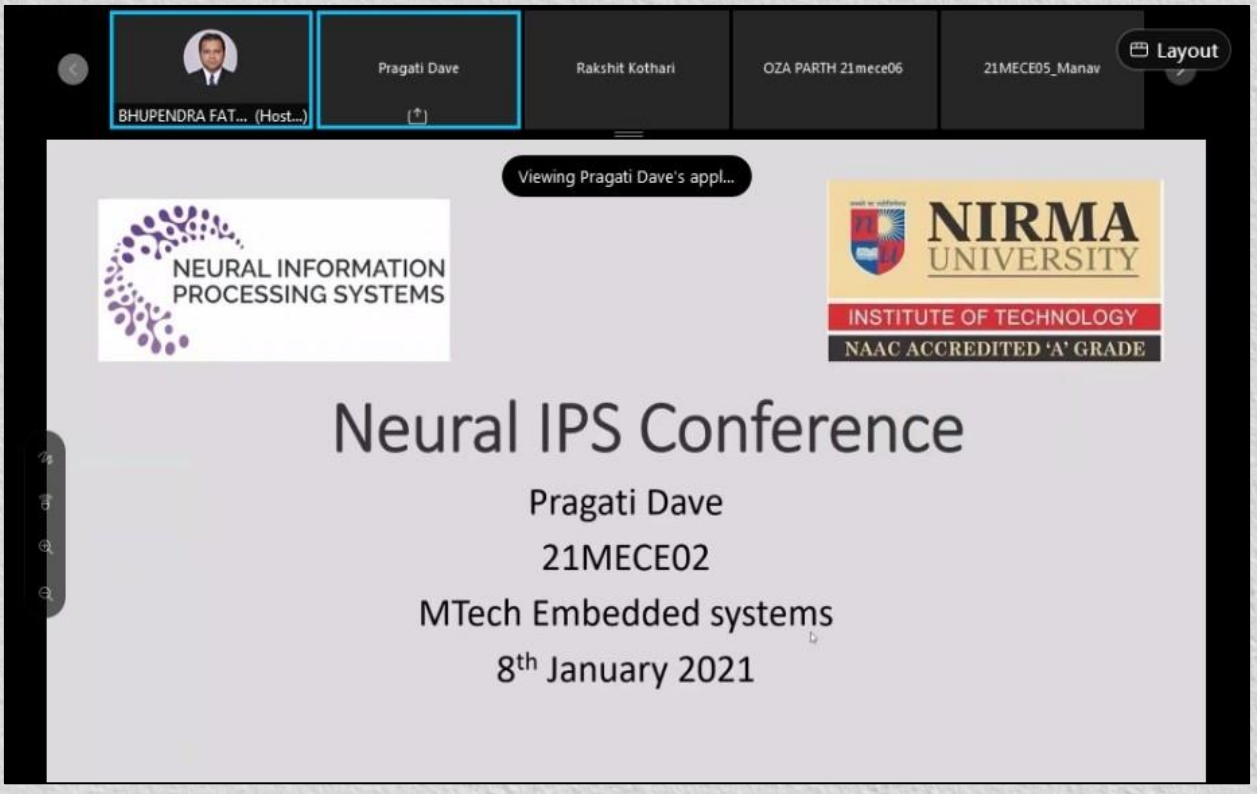
The Department of Electronics and Communication Engineering, Institute of Technology, Nirma University, follows student-centric learning approach and to promote research and innovation among students, the department took the initiative to organize a student conference on 'Advancement in Communication, Electronics, Computer and Automation Technology' (ACECAT), in the year 2021. After the success of ACECAT-2021, the EC department will host the second version of ACECAT, the National Conference on 'Advancement in Communication, Electronics, Computer and Automation Technology' (ACECAT-2022), organized exclusively for Students of UG, PG and Ph.D. Programme. The Conference is to be held during April 08-09, 2022 in Virtual Mode. ACECAT 2022 aims to promote research-based innovations in the fields of Electronics and Communication, Instrumentation, Computer Science and Information Technology. We have with us Industry experts and Researchers who will enlighten the participants and will share ideas and experiences surrounding ACECAT.

For all the Important Details, please visit the conference website: https://sites.google.com/nirmauni.ac.in/acecat/home

Alumni Provided Funding for Participating in Conference

The alumni of EC department take good interest in helping the department, and they also provide funding to students to attend prestigious conferences. This year, alumni provided funding for the NeurIPS conference, which is one of the most premier conferences on Machine Learning, which was held virtually on December 06-14, 2021. The cost for the full-time student to attend this conference was 25$. One of our alumni, Dr. Rakshit Kothari from the USA sponsored our six students of B.Tech. and M.Tech. who are interested to attend this conference. The Registration Fees for these students were paid by Dr. Rakshit. All six students attended the conference fully. After attending the conference, the attendee students were asked to make presentations based on their learnings from the conference. The presentations were scheduled for January 08, 2022, through the WebEx platform. Dr. Dhaval Pujara, HoD - EC Department, Dr. Bhupendra Fataniya, Alumni Coordinator, and Dr. Rakshit Kothari, remained present in the online presentations. All the six students presented gist of six

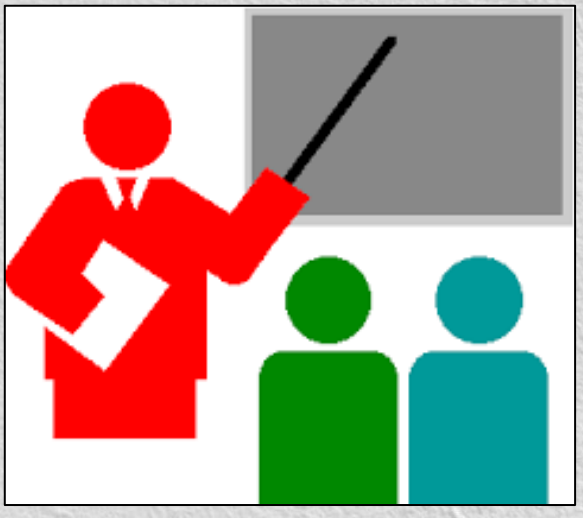
Best Practices of the Department



papers of the conference, learning from the conference and planning based on the learning.

Pedagogy Lectures by and for the Faculty Members

The Department of Electronics and Communication Engineering takes regular initiatives to enhance the faculty development, and to fulfill the thought, the department organizes regular Pedagogy Lectures by and for the faculties, in which there are lecture sessions on different technical and general topics, which are conducted by a faculty, as a speaker and the other faculty members are the audience. This develops peer-to-peer learning among faculties and gives a chance to each faculty member to come forward and share their ideas and knowledge with fellow members.

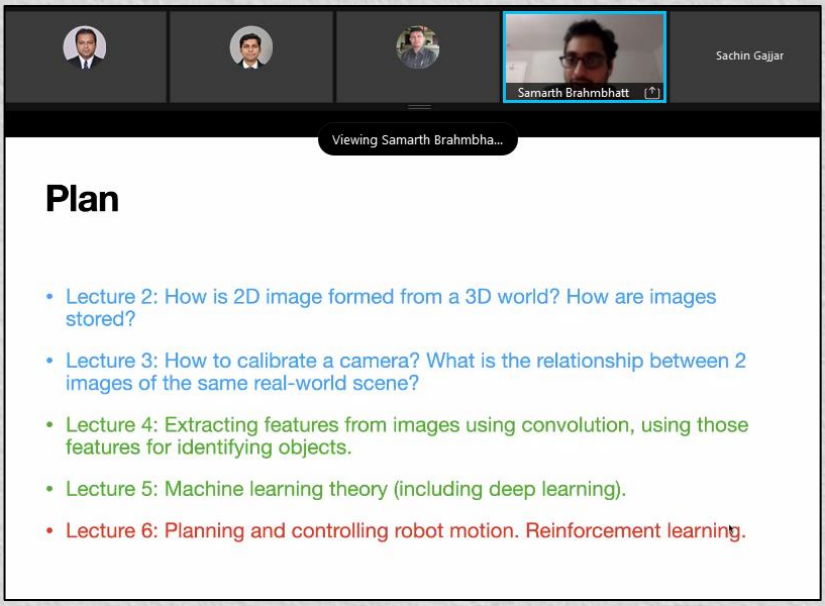


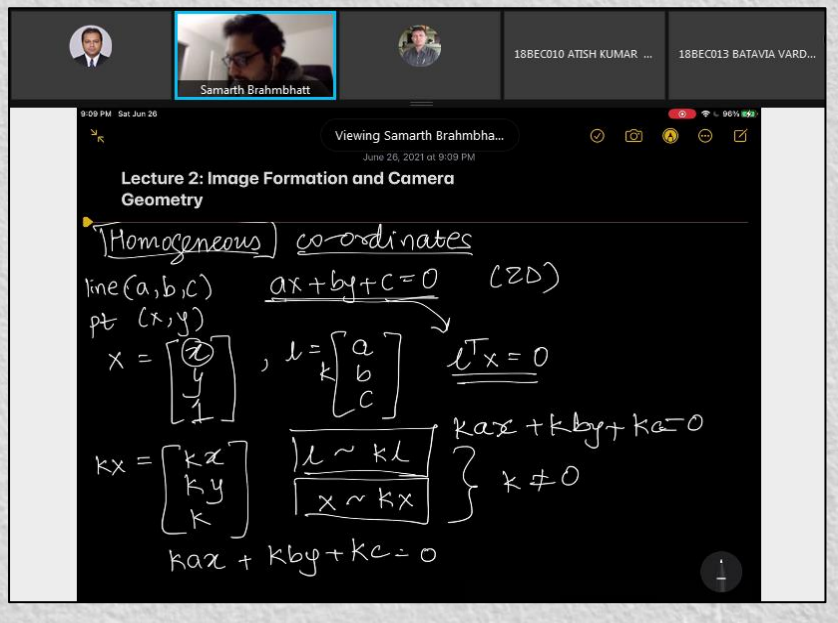
Courtesy: https://bit.ly/3sY1VZn

Events by the Department

Lecture Series on "Computer Vision, Machine Learning and Robotics"

The Department of Electronics and Communication Engineering organized a lecture series on "Computer Vision, Machine Learning and Robotics". The entire lecture series was planned for the B. Tech students of the ECE department. Dr. Samarth Brahmbhatt, Post-Doc in the Intel Intelligent Systems Lab, USA, and alumnus of Nirma University conducted six sessions on CV-ML-Robotics during June-July 2021. Students actively participated in all the sessions and the various queries related to CV, ML and Robotics were responded to by Dr. Samarth Brahmbhatt.





Events by the Department

AICTE ATAL Academy Sponsored one-week FDP (Online) On "Internet of Things (IoT) for Agriculture"

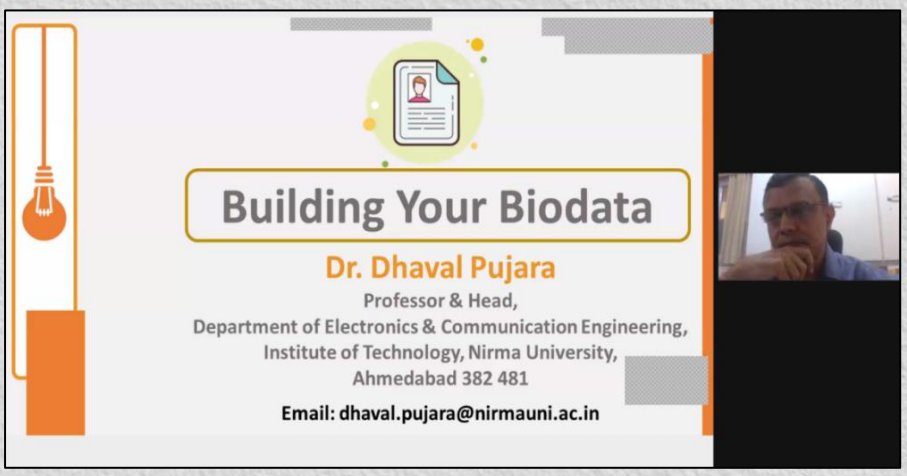
An one-week online Faculty Development Programme on "Internet of Things for Agriculture" was organized during July 19-23, 2021 through the WebEx platform. This FDP was fully funded by the AICTE-ATAL Academy. Department of Electronics & Communication Engineering had received the fund of INR 93,000/- for organizing this FDP. During this FDP, renowned experts from Industry and Academic Institutes conducted all the sessions. The registration of the webinar was open for faculty members of all the Universities across the nation. 200 participants from different states of the country have participated in this Faculty Development Programme. This FDP was coordinated by Dr. N. P. Gajjar and Dr. Manisha Upadhyay from Electronics and Communication Engineering Department. The inaugural session at the Institute was chaired by the Director, Institute of Technology and HoD, Electronics and Communication Engineering Department, ITNU. Common inauguration session of 24 ATAL-FDP was organized by the ATAL academy and chaired by Dr. T. G. Sitharam, Director-IIT Guwahati. Prof. Ashutosh Dutta, Johns Hopkins University, USA had given keynote address in this programme on 5G Networks for IoT and Security: Opportunities and Challenges.

The FDP was scheduled for five days from 10:00 am to 5.00 pm with lecture sessions by the renowned academicians and experts of this field from the industry. Also, the demonstrations of various projects based on the Internet of Things in Agriculture were presented.

Events by the Department

Online Orientation Programme for B.Tech. EC Semester - 3, 5, and 7

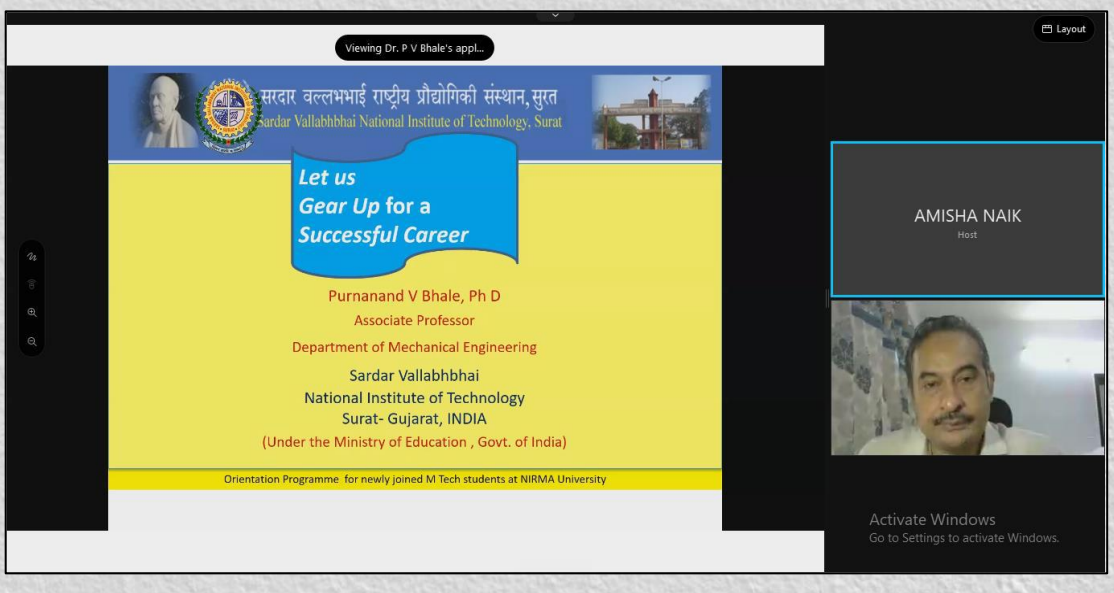
The Department of Electronics and Communication (EC) Engineering organized a one-day Online Orientation Programme for the students of B.Tech., Semester - 3, 5, and 7. The schedule was prepared at the department level in coordination with the Coordinators Dr. Yogesh Trivedi, Dr. Vaishali Dhare, Prof. Bhavin Kakani, and Dr. Dhaval Pujara, HOD-EC. The orientation program began on July 22, 2021 (10:10 am) with prayer and welcoming of the students by HOD, EC. The event was attended by all the students and faculty members. The HOD-EC addressed all the students and briefed them about the academic disciples and regulatory norms to follow during this unprecedented situation. Different guest sessions followed by and the students attended them positively. Also, ECO club planned a session to create bonding between the senior and junior students. The team ECO conducted various games and fun activities to refresh the minds of the audience. Prof. Y. N. Trivedi, Coordinator, Orientation programme B.Tech. concluded the Orientation programme and thanked the Director IT, Dr. R. N. Patel and the HOD-EC, Dr. Dhaval Pujara for assigning the responsibility of the orientation program to his team.



Events by the Department

Online Orientation Programme for M.Tech.-First Year

The Department of Electronics and Communication Engineering organized a Three-days Online Orientation Programme for the students of M.Tech. Semester – 1 (Embedded System & VLSI Design), during August 5-7, 2021. The schedule was prepared at the department level in coordination with PG-Coordinators Dr. Usha Mehta and Dr. Nagendra Gajjar. The various sessions were planned to brief the students about the department and teaching schemes of four semesters. Also, industries expert from Intel and Arm were invited to deliver sessions to brief students about industry requirements. Alumni of the Electronics & Communication Engineering Department are invited to interact and motivate students.

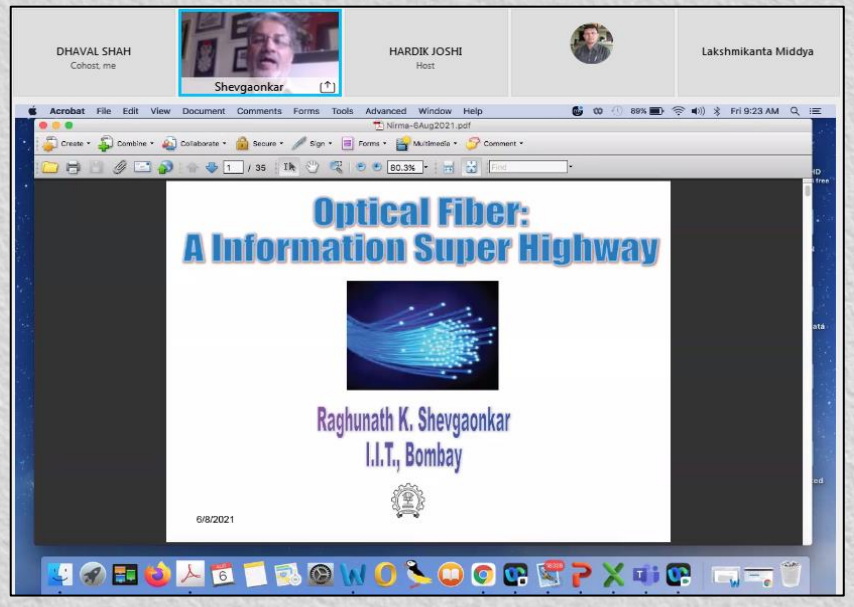


Events by the Department

GUJCOST sponsored Two-Day National Webinar on "Optical Wireless Communication: Challenges and Opportunities"

A Two-Day National Webinar on "Optical Wireless Communication: Challenges and Opportunities" was organized from August 6-7, 2021 through the WebEx platform. This webinar was partially funded by the Gujarat Council on Science and Technology (GUJCOST). All the sessions in this webinar were conducted by renowned experts from Industry and Academic Institutes. The registration of the webinar was open for engineering students of UG, PG, and PhD programs, faculty members, and industry personnel across the nation. More than 20 participants from different regions participated in this National level seminar. The webinar was coordinated by Prof. Hardik Joshi and Prof. Dhaval Shah from Electronics and Communication Engineering Department. The inaugural session was chaired by the HoD, Electronics and Communication Engineering Department, IT-NU. The webinar was planned for two days from 8.45 am to 4.00 pm with expert sessions as well as a demonstration of the design of FSO link, Optical links in Optisystem, and FSO channel BER analysis in MATLAB software which are utilized in the industry for design and simulation of OWC links. Both the coordinators and the following experts were the resource persons who conducted sessions in the webinar:

- Prof. (Dr.) Raghunath Shevgaonkar, Emeritus Professor, IIT Bombay
- Prof. (Dr.) Yogendrakumar Prajapati, MNIT Allahabad
- Prof. (Dr.) Vivek Bohara, IIIT Delhi
- Dr. Sanya Anees, IIIT Guwahati
- Dr. Anirban Bhowal, INRS-EMT Montreal, Canada

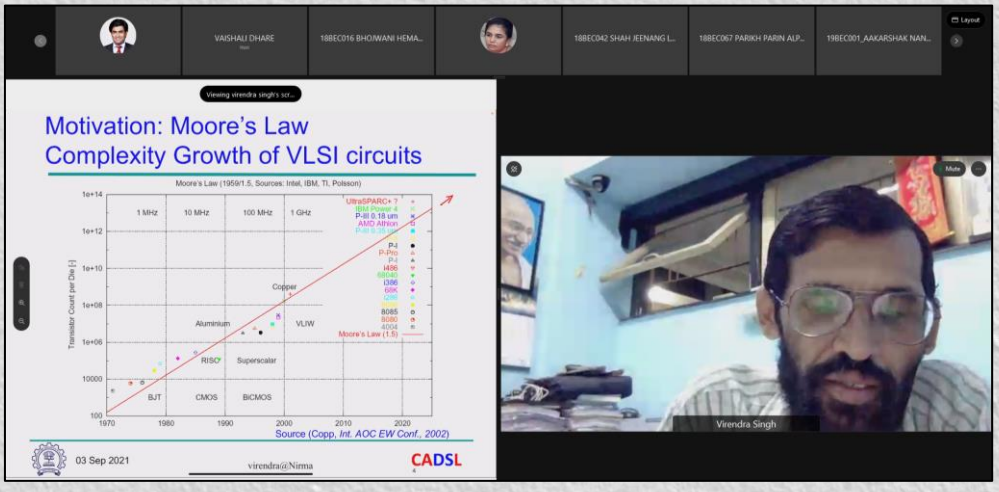


Events by the Department

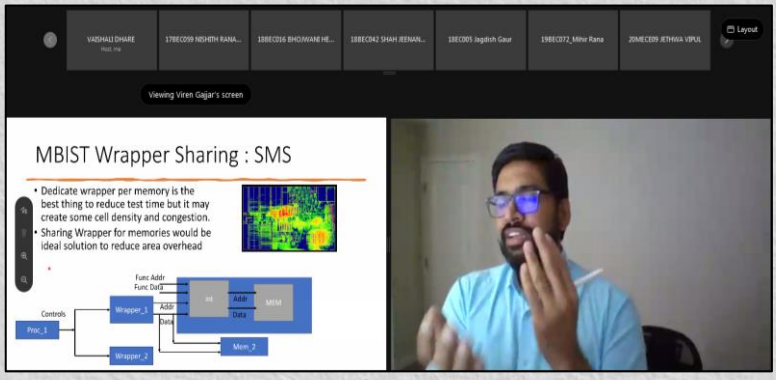
Two Days International Webinar on "Testing and Verification of VLSI Design"

Two Days International Webinar on "Testing and Verification of VLSI Design" was organized on September 3-4, 2021 on the WebEx platform from 9:00 am to 4:30 pm. The webinar was coordinated by Dr. Usha Mehta and Dr. Vaishali Dhare from Electronics and Communication Engineering Department, ITNU. The webinar received an overwhelming response. More than 550 participants, including 94 participants from 57 different MNCs, 63 faculty participants from 40 Institutes and more than 400 students from 162 Institutes had registered for this webinar. Also, a few international participants from Arizona State University and the National University of Singapore had registered.

The prime objective of this webinar was to provide an introduction to testing and verification and also aimed to have a basic understanding of contents like Verification Methodologies, Functional Verification and Code Coverage, Static Timing Analysis, Fault Modeling and Automatic Test Pattern Generation, Design-For-Test, Built-In-Self-Test, JTAG, SoC Testing, etc.



Events by the Department



Briefing Session for Preparing the Students for the Placement in eInfochips (An Arrow Company)

The Department of Electronics & Communication Engineering organized a Briefing Session for Preparing the Students for the Placement in eInfochips (An Arrow Company). The session was held on September 7, 2021, from 3:00 pm to 4:00 pm on the WebEx Platform for the students B.Tech. EC, Semester VII. Dr. Dhaval Pujara, HoD-EC advised students to prepare well and put in the best efforts for the campus placements. Dr. Piyush Bhatasana, Dr. Akash Mecwan, and Dr. Dhaval Shah guided students on technical aspects which covered the basics of VLSI Design and Embedded Systems. More than 100 students participated in this webinar. The session was coordinated by Prof. Jayesh Patel.

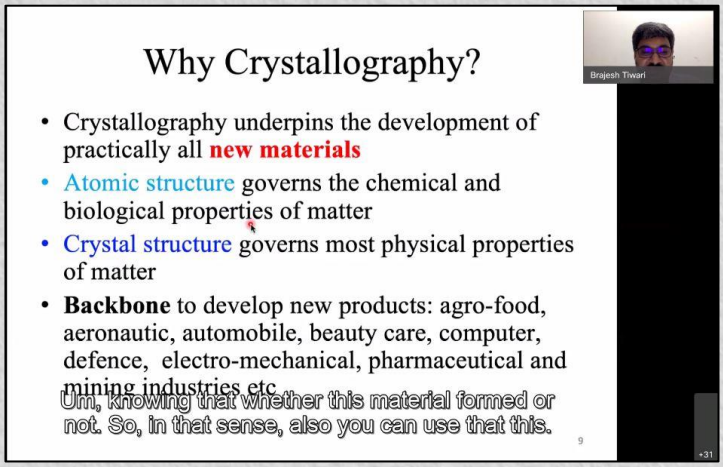
National Workshop on "Rietveld Refinement of XRD Data"

A five-day National Webinar on "Rietveld Refinement of XRD Data" was organized from September 13-17, 2021 on the WebEx platform from 4:00 pm to 6:00 pm. The workshop was coordinated by Prof. Tanuj Gupta, Dr. Ankur Pandya, and Dr. Chetna Chauhan from the Department of Electronics and Communication Engineering, Institute of Technology, Nirma University. The workshop received an overwhelming response. Many participants, including faculty and students from different institutes/universities across India such as SVNIT-Surat, Rajasthan University, Manipal University, Saurashtra University, etc. had registered for this workshop.

The prime objective of this workshop was to provide an introduction to basic concepts of X-ray Diffraction. Further, this workshop aimed to impart a basic understanding of different tools used for XRD analysis such as FullProf and VESTA.

Dr. Dhaval Pujara, Head of the Electronics and Communication Engineering, Institute of Technology presented the welcomed address. The eminent speakers from the Physics domain Dr. Brajesh Tiwari, Assistant Professor, IITRAM, Ahmedabad; Dr. Devang Shah, Assistant Professor, and Head, Government Arts and Science College, Bavla, Ahmedabad, delivered the expert talks on various topics related to the workshop.

Events by the Department



Alumni Interaction for the Preparation of Campus Interview for Core Companies

The Electronics and Communication Students' Organization (ECO) organized an interactive session for the students of B.Tech. EC Semester - 7, on September 21, 2021 using WebEx from 9:10 am to 11:10 am. The Alumni of the Department, who are placed in the core companies, have interacted with the present students. More than 60 students of Semester - 7 participated in the event.

Various issues like important subjects for the placements, important topics for the placement, Core companies and their profiles for EC branch, requirements of coding skills, impact of co-curricular and extra-curricular activities in placement, designing the resume, importance of minor and major project, off campus applications, etc. were discussed at length in the interaction. Following alumni students participated in the interaction very enthusiastically.

Sr. No.	Name of Alumni	Alumni of	Current Company/ Company will be talking about
1.	Shivani Chaudhari	B.Tech. (2012-2016) and M.Tech. VLSI (2016-2018)	ARM
2.	Vinayak Sharma	B.Tech. (2015 - 2019)	IBM Infineon (Cypress)
3.	Ashutosh Bhargava	B.Tech. (2015 - 2019)	Cadence
4.	Abhishek Raj	B.Tech. (2015 - 2019)	Qualcomm
5.	Tejas Mutthal	B.Tech. (2015 - 2019)	NXP Semiconductor
6.	Nikunj Moradiya	B.Tech. (2009 - 2013)	Mentor Graphics, NVIDIA

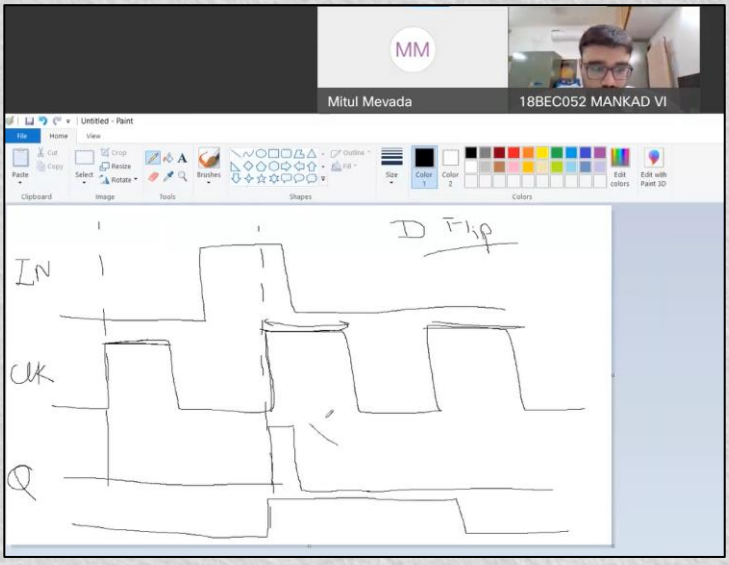
Events by the Department

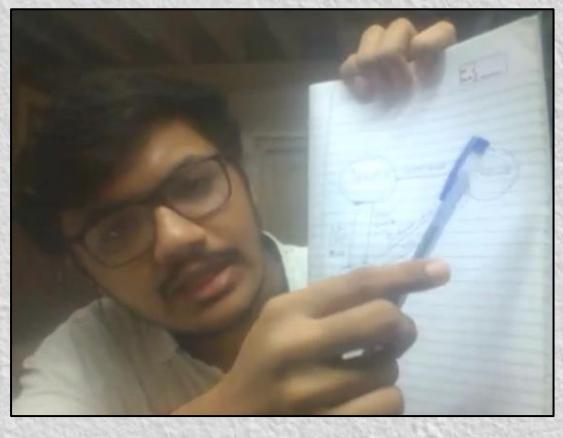
Mock Interview Session for Final Year Students

Facing an interview is a process that invokes nervousness in any individual. Lack of confidence may ruin the entire hard work of an individual that has been put in the preparation of the interview. To boost the confidence to face the interview of a final year student, a mock interview session and interaction with the corporate interviewer was arranged on October 02, 2021, from 10:30 am, using WebEx Online Platform to boost the confidence to face the interview of a final year student. Alumni members of the EC department provided their services for the same. The following alumni members of the EC department provided their services for conducting the mock interview sessions:

- Mr. Devang Gajjar, Sr. Design Engineer, Intel, Bangalore
- Mr. Timir Soni, Design Engineer, eInfochips
- Mr. Mitul Mevada and Ms. Modini Ayyagiri, Infineon Technologies
- Mr. Vinayak Sharma and Mr. Pranjal Shrivastava, Infineon Technologies
- Mr. Vimal Zalariya, Silicon Validation Engineer, Google.

More than 25 students from semester VII EC participated in the activity. Questions were asked from Basic Electronics, Digital Electronics, C Programming, Embedded Systems. Feedback for each candidate on their strong and weak points in the interview and improvements needed was given. The session was very fruitful and will surely help students to crack their interviews in the future.

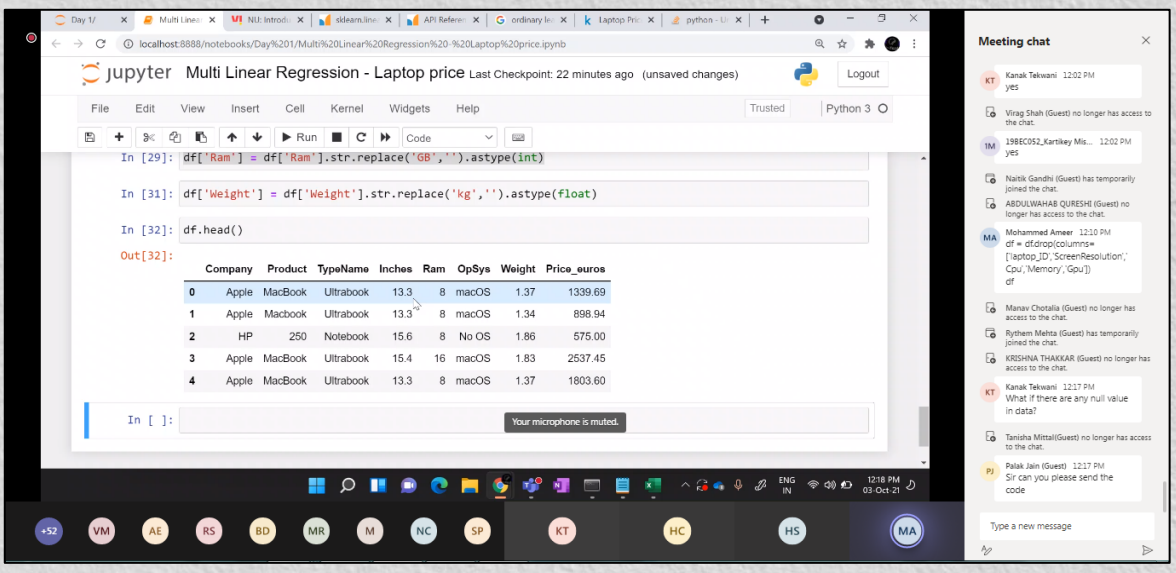


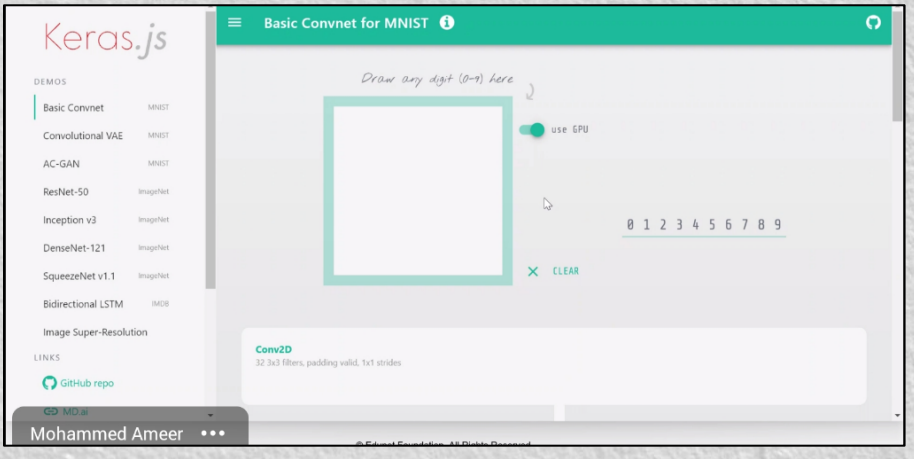


Events by the Department

Online Workshop on "Fundamentals of Artificial Intelligence and Machine Learning"

The Department of Electronics & Communication Engineering, Institute of Technology, Nirma University organized an online workshop on "Fundamentals of Artificial Intelligence and Machine Learning" from October 2-4, 2021. The three-day workshop was organized in collaboration with Vodafone Idea Foundation and was conducted on online mode and the objective of the workshop was to familiarize the participants with (i) Basics of Artificial Intelligence, (ii) Concepts of Machine learning algorithms, (iii) Use of Python for Machine Learning and Deep Learning. The workshop was conducted by Mr. Jonathan Rajiv, Senior Program Manager from Vodafone Idea Foundation, and coordinated by Dr. Sachin Gajjar from the Department of Electronics and Communication Engineering. During the programme, apart from the lectures by the experts, there were hands-on sessions on various concepts related to Artificial Intelligence and Machine learning using the Anaconda framework.





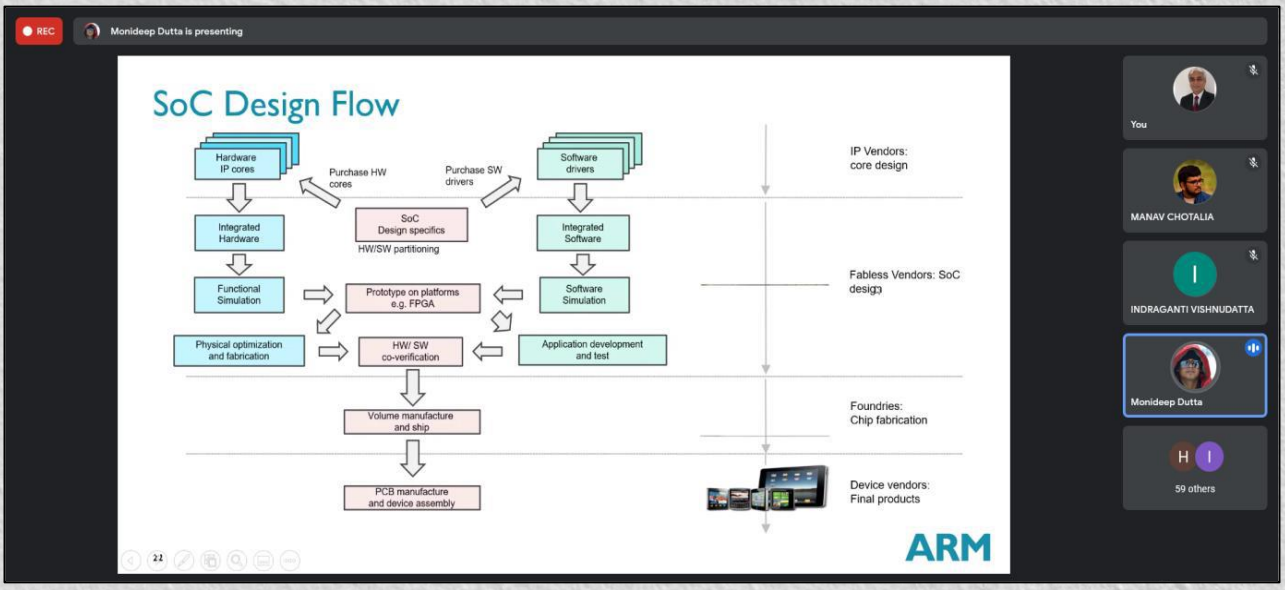
Events by the Department

ARM Tech-Talk Series Lecture on "SoC Design"

A lecture on "SoC Design" was organized under the ARM Tech-Talk series at the Department of Electronics & Communication Engineering, Institute of Technology, Nirma University. The Lecture was held on October 08, 2021 from 4:00 pm to 5:00 pm. It was conducted in online mode through the Google Meet platform. The students of B.Tech. Semester 5 (EC), M.Tech. Semester 1 of VLSI Design and Embedded Systems attended the talk. More than 70 students participated.

The talk was given by Mr. Monideep Dutta, Director of Engineering at Arm-Bangalore, System Engineering Group. The speaker has 25 years of work experience in the industry and has worked previously in Wipro/Texas Instrument, and Intel. He has worked in different capacities in areas like SoC Design, Verification (pre and post-Si) and IP Design, BizDev, etc. He holds a degree in Electronics and Communication Engineering from NIT Durgapur and EGMP from IIM-Bangalore.

Mr. Dutta started with the introduction of the SoC, advantages, applications, design Challenges, and its importance, and the industry trends. He gave a detailed explanation of the SoC Design flow and its stages. It was very well received by all the participants. The talk was followed by a fruitful question-answer session.



Events by the Department

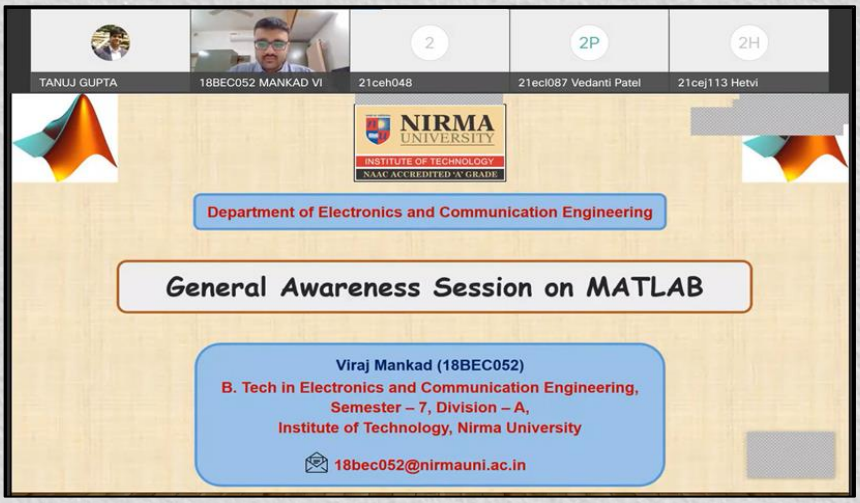
MoU with Finecure Pharmaceutical Co.

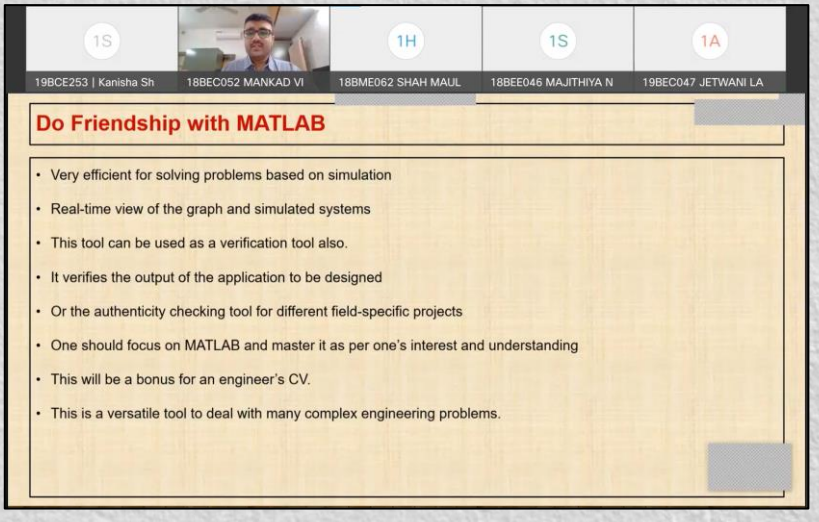
The Department of Electronics and Communication Engineering, Institute of Technology under Nirma University, Ahmedabad has signed a Memorandum of Understanding (MoU) with a globally renowned research-driven multinational healthcare company, the Finecure Pharmaceuticals Ltd. The purpose of MoU is to carry out collaborative research work on the planned innovative ideas as well as to provide project-based learning opportunities to the students of the institute.

Events by the Department

General Awareness Session on MATLAB

A General Awareness Session on "MATLAB" was conducted by Mr. Viraj Mankad (Roll No.: 18BEC052), a student of B. Tech EC, Semester - 7, for the First Year Students of B.Tech. Programme of all the departments of Institute of Technology, Nirma University. This session was conducted under the guidance of Prof. Tanuj Gupta. A total of 170 students joined this session, and it was held on December 19, 2021, from 11 am to 12.30 pm. Along with the presentation on MATLAB and its applications in all fields of engineering, there was an Experience Sharing session also. Four students from different departments Mr. Maulik Shah (Roll No.: 18BME062), Ms. Nandini Majithiya (Roll No.: 18BEE046), Ms. Kanisha Shah (Roll No.: 19BCE253) and Mr. Lalit Jetwani (Roll No.: 19BEC047) shared their experiences about working with MATLAB and how this software was useful to them in their respective departmental studies. The session was concluded with a discussion about the upcoming MATLAB Hackathon organized by the Department of Electronics and Communication Engineering, Institute of Technology, Nirma University.



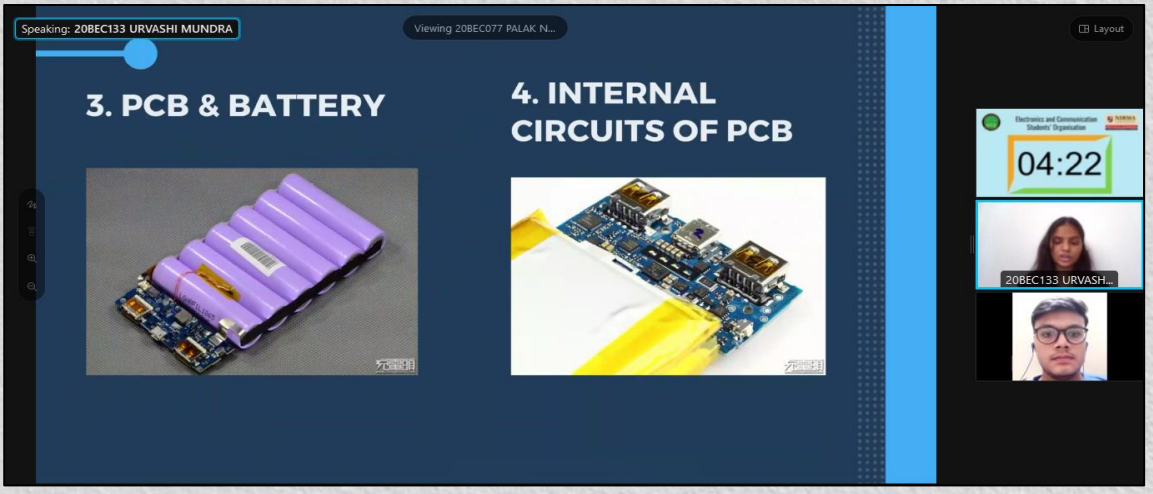


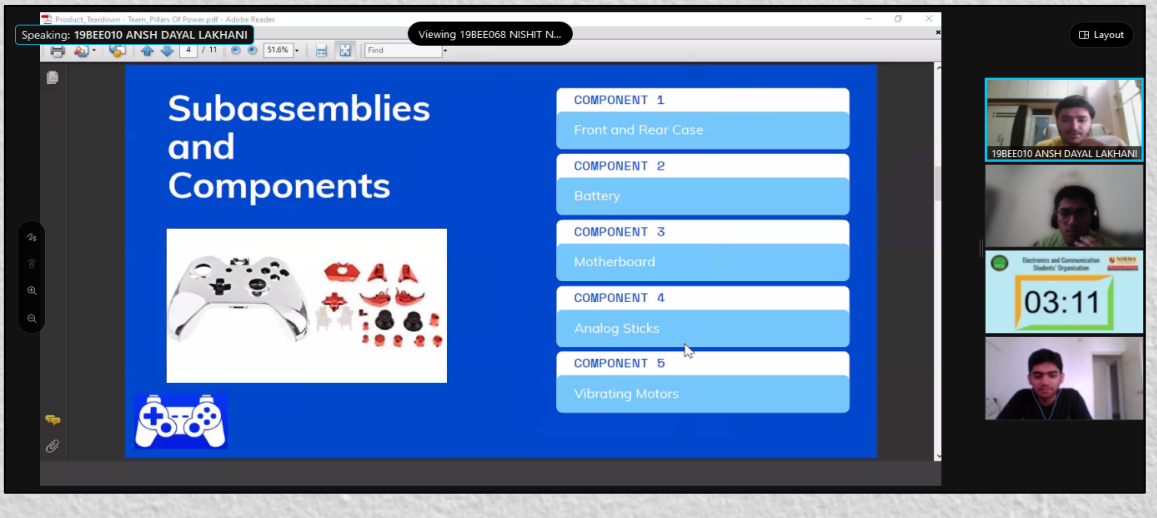
Events by the ECO

Product Teardown

The Electronics and Communication Students' Organization (ECO) organized an online Technical event named 'Product Teardown' on the occasion of 27th Foundation Day on October 3, 2021, from 11:00 am to 1:00 pm via Cisco WebEx. A total of 20 teams had participated. As part of this competition, participants were given a sample presentation alongside their products (topic) to teardown and guidelines for the event. In their presentation, brief descriptions of their products were given, and they had been given 24 hours to prepare a presentation on the said topic. They had to suggest layer by layer product breakdown of their product and they had to suggest improvements and what all changes they could do in each layer to make the product more efficient and cost-effective.

Final winners were declared according to the marks given by the judges Dr. Ruchi Gajjar and Prof. Rutul Patel. The winning team was the team Triangle troop which had members, Kairav Acharya, Akshaat Singh, Akshay Gupta.

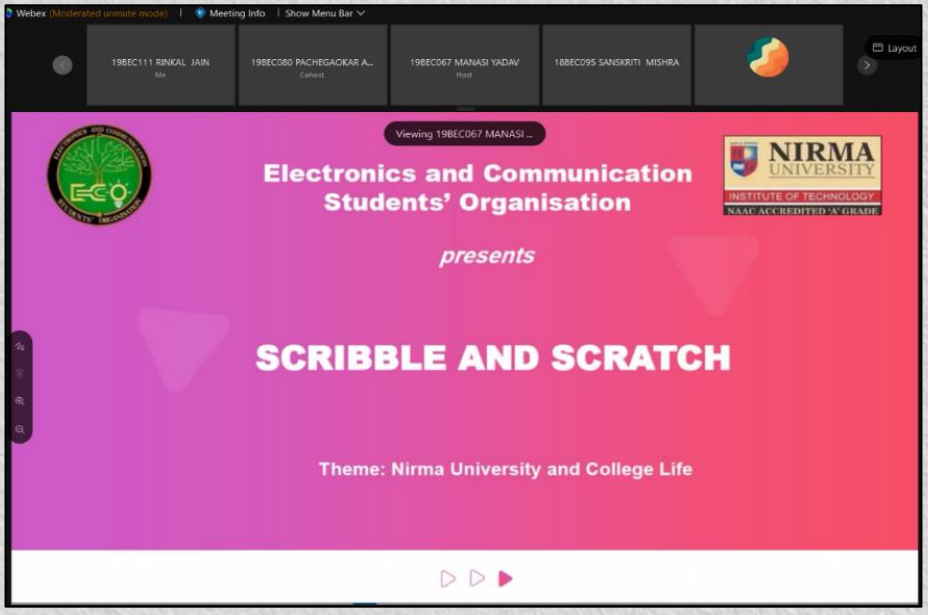


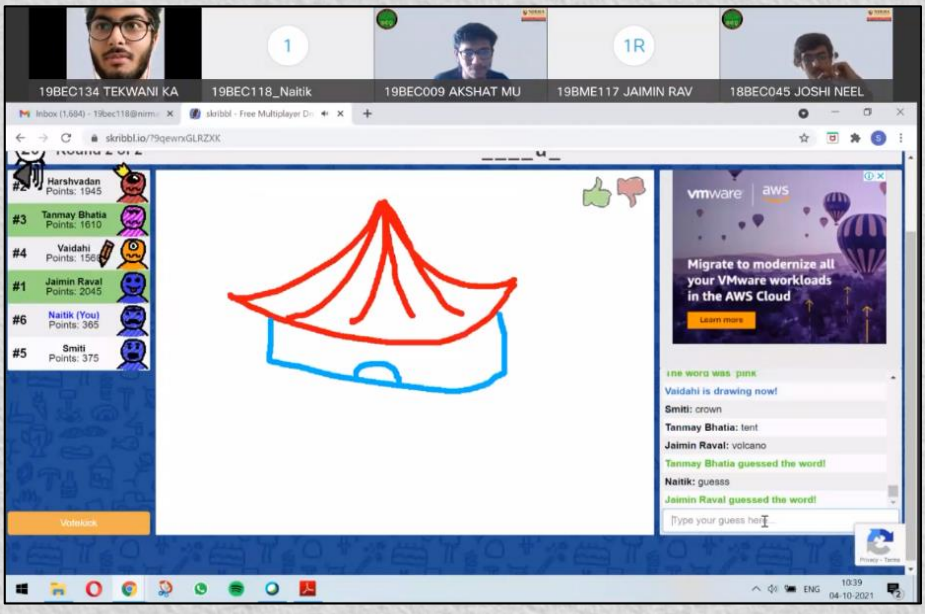


Events by the ECO

Scribble & Scratch

The Electronics and Communication Students' Organization (ECO) organized an online fun event named 'Scribble & Scratch' on the occasion of 27th Foundation Day on October 4, 2021, from 10:00 am to 12:00 pm via Cisco WebEx. There were more than 50 registrations received from various disciplines and semesters. Judgment was based on scores provided by the game hosting site to make it transparent. The participants were given a briefing on the game's guidelines and rules before being given an online Skribbl.io link with custom theme words related to Nirma University and college life, where each participant chose a word and had to draw a digital impression of that word while letting other players guess it within 100 seconds.

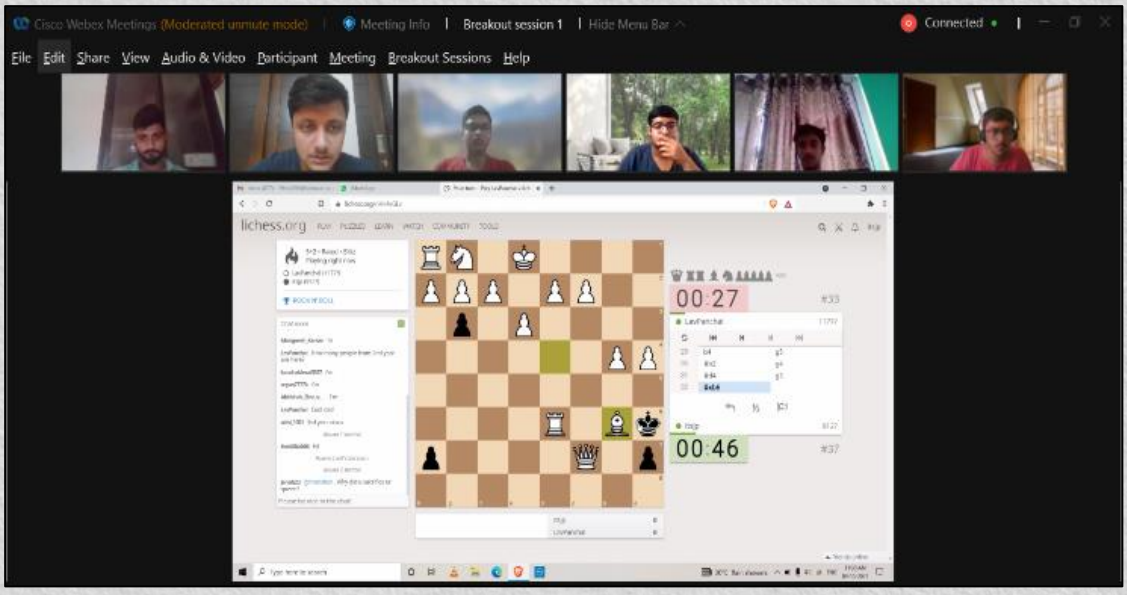


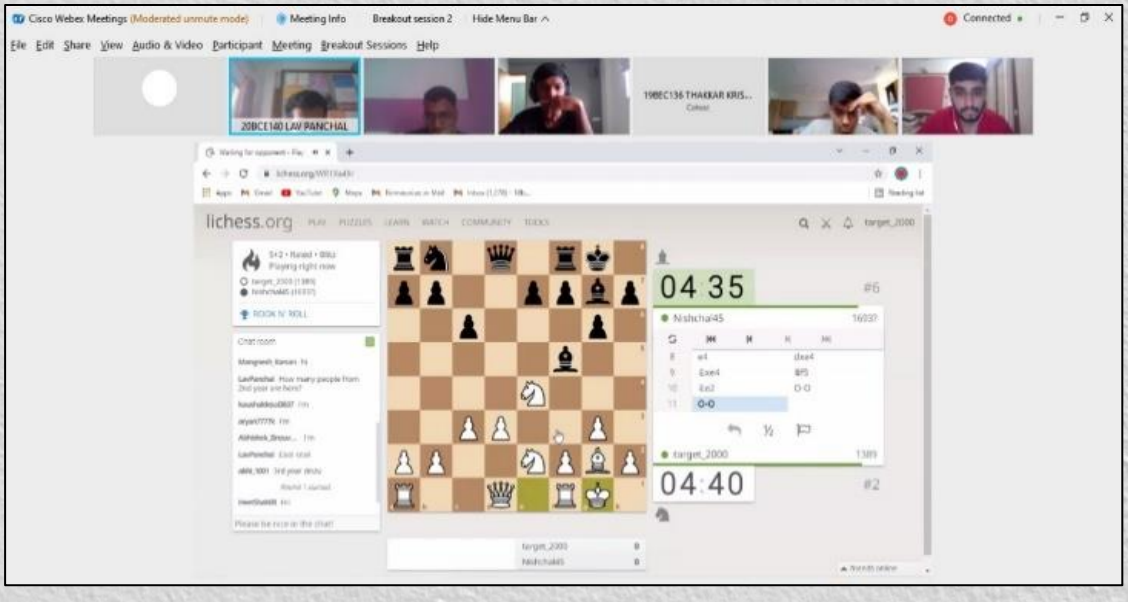


Events by the ECO

Rook N' Roll – The Saga of 64 Squares

The Electronics and Communication Students' Organisation (ECO) organized an Online Chess Tournament, 'Rook N' Roll – The Saga of 64 Squares' on October 9, 2021, from 10:30 am to 1:30 pm on the Lichess platform via Cisco WebEx. A total of 53 registrations were received for the event, out of which 29 were Non-ECO members and 24 were ECO members. 38 participants played in the tournament including players across all years of ITNU and one esteemed faculty member of the EC department. The players competed in the Swiss format where the number of rounds was 8 and the time control for each player was 5 minutes + 2 seconds increment.

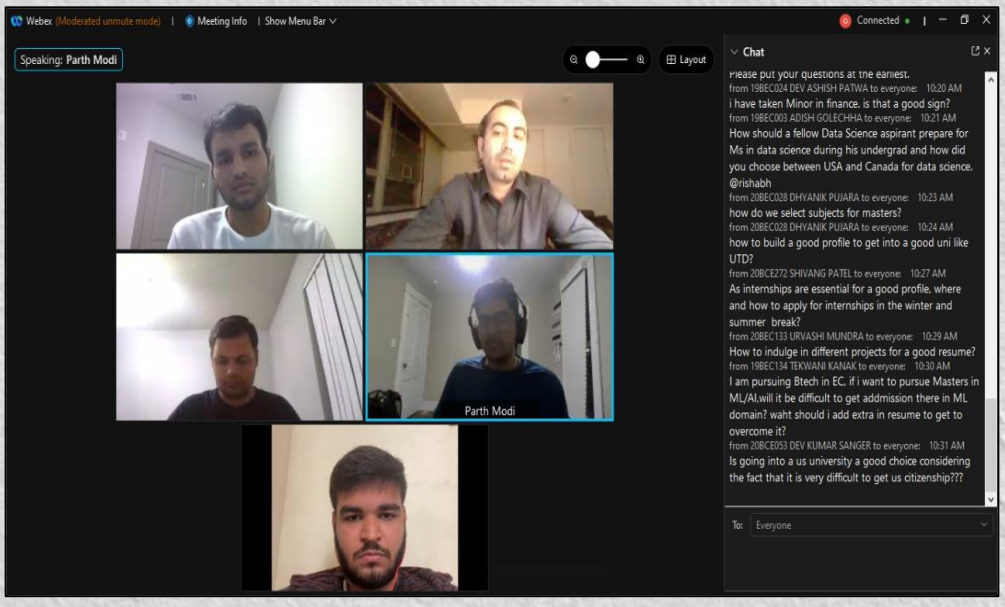




Events by the ECO

Session on Study Abroad

The Electronics and Communication Students' Organisation (ECO) organized an online session named 'Session on Study Abroad on October 09, 2021, from 9:00 am to 11:00 am via Cisco WebEx. A total of 114 students from various branches of ITNU had participated in the session. In this session, various experts who had knowledge about education in different countries and alumni pursuing masters and Ph.D. in different domains had been invited for an interaction with the students who were interested in pursuing further studies in foreign countries.



Events by the ECO

Sweet Distribution

The Electronics and Communication Students' Organisation (ECO) organized a Sweet Distribution Programme on October 26, 2021, for all its support staff working members on the occasion of Diwali and to wish them a prosperous New Year. The ceremony was held on the C-D lawn in utter accordance with social distancing norms and other sanitary regulations. Support staff working members from all the departments including hostels, garden labour, Shri Siddhivinayak, COSMOS security, and Sulabh, across the university and school, were invited for sweet distribution.

ECs' Got Talent: Articles

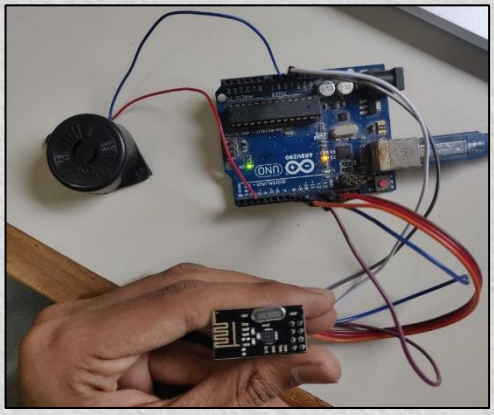
DIY AirTags

Vardhan Batavia
(Roll No.:18BEC013)

So, Apple released Airtags last year. Attach it to your wallet, keys, or bags and locate them with your phone. https://www.apple.com/in/airtag/

When something is valued at $3 and priced at $30, there's enough motivation to build it.

Airtags use BLE (Bluetooth Low Energy), a low power protocol similar to Bluetooth, working at 2.4 GHz and giving a range of around 10m. There are 2 fundamental types: Beacon and Listener. A beacon advertises packets that have a UUID to identify the sender, payload carrying data, and headers for the BLE stack. A listener receives these packets and decodes them. All of this happens connectionless. Take it like YouTube ads, the ones interested listen to ads, rest of them ignores.



So what do we need? A 2.4GHz transceiver, a piezo that beeps, and a low-power MCU with a pinch of memory!

Looking for transceivers, I came across nRF24L01+ (and its Chinese counterfeits) costing about $1, but had no processing power onboard, just loads data to buffer via SPI interface. So we need an Arduino UNO to process this data.

The default RF24 library built by Nordic doesn't have BLE implemented. It was designed to be used for Bluetooth and WiFi only. But, BTLE is a library that works on top of the standard RF24 library to implement BLE. So, configured the transceiver as a listener, picked a UUID, coded it onto Arduino, sneaked in the BTLE library (to read UUID from the buffer), and it was working.

Using the nRF connect app on Android, advertised specific BLE packets and our Airtag beeps as soon as it sees them coming! More the packets, more the beeps, so you know when you're close to the tag. A little change in the code will turn the same setup into a BLE Beacon.

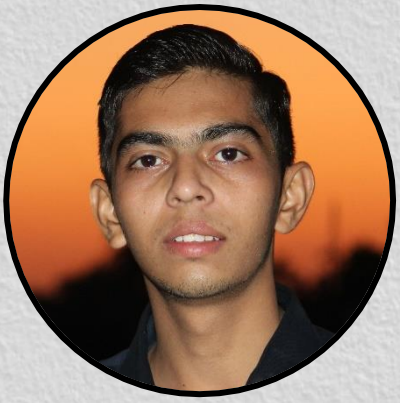
This technology was deployed back in 2013 by Google as project Eddystone for proximity marketing but they brought it down in 2018. More on that here: https://xamoom.com/google-kills-eddystone-why-it-does-not-mean-a-lot/

To bring this close to a marketable product, the next thing was optimization. To reduce power, Attiny85 was a sweet alternative, an 8 pin MCU, as powerful as Arduino UNO but was very overpriced due to chip shortage. The device is still far from being a product and

more of a proof of concept. It serves the chief purpose of its Apple counterpart, which is to find stuff.

The ultra wideband that Apple is using is one of the key technology for precisely finding the device. Implementing it is not as simple though. Power consumption is fairly high, Arduino UNO is definitely overkilling. I found the nRF51822 which has BLE, an 8-bit low-power MCU, and BMS built-in, exactly the device I was trying to make. Making something a tech giant has built was so much fun!

Time & its Direction - Mystery of Universe



Sanjaykumar Parmar
(Roll No.: 18BEC069)

Time is one of science's most fascinating elements, and its nature has flummoxed philosophers and scientists for centuries. You must have questioned what the direction of time is, at least once in your life. It is easy to say that time moves in the right direction/forward direction. But what is this forward direction? Is moving backward in time even possible? If yes then why don't we experience it? Time travel means going between different points in time, which feels like a very great concept for a moment.

Let's just forget the world around us and dive into the quantum world. Here things are governed by a different set of rules or equations that make time-reversal a reasonable possibility. It's simple, just take any equation that contains time t and replace it with -t, if the resultant expression remains the same then the phenomenon won't change if you reverse time. Out of all the four fundamental forces in nature, three follow this beautiful time symmetry at the quantum scale. But then again, when we return to the macroscopic world, the possibility of time being homogeneous vanishes on a large scale. And the time appears to move in one direction, which is forward.

Over the years. Scientists have tried to connect the direction of time with the universe. In 1927 English astrophysicist Arthur Eddington came up with the arrow of time that explains the direction in which time moves. The thermodynamic arrow of time is the most significant arrow of time. It is said that time always moves in the direction of increasing universe disorder. Suppose there is an egg in your hand, you throw it down and it breaks. So, The disorder/ entropy of that system has increased. However, the converse is not possible; a broken egg cannot be reassembled. So, if you consider the universe as an enclosed system, the arrow of time reflects the increase in the universe's entropy or disorder. This thermodynamic arrow is the most important one, and it is closely related to another time arrow, the cosmological time arrow.

According to the big bang theory, our universe emerged from a singularity about 13.8 billion years ago. It has been expanding ever since. The expanding universe is indicated

by the cosmological time arrow. There would be no change in entropy if there was no expansion, according to the thermodynamic arrow of time. The two arrows discussed thus far are difficult to comprehend in everyday life, but there is another arrow that is very clear.

Can you feel full without even eating something? The answer is no because you need a cause to observe an effect. So to some extent, by causing something to happen, we control our future, but no matter how hard we try, we cannot change the past. Although it has nothing to do with physics, causality is inextricably linked with the arrow of time. If you look closely at nature, you will notice one pattern. All waves, whether light waves, radio waves, sound waves, or even water waves, are radiative. They always seem to propagate outward from their starting point. This asymmetry is related to another type of time arrow known as the radiative arrow. This is related to the thermodynamic arrow once again because as the radiation moves away from its source, the entropy increases.

So far, you must have realized that reversing the direction of time will not result in the universe remaining the same. But there is a way by which we can reverse the direction of time, and still, the resultant universe will remain identical to the first one. Yes, you read it right, this is known as the CPT symmetry. C, P, and T are operators in physics. Here C stands for charge conjugation - By substituting each particle in the universe with their respective antiparticles. P means parity inversion - taking a mirror image of the universe. Finally, T represents time reversal. So, if you take a mirror image of the universe, replace its particles with antimatter particles, and then reverse the direction of time, the resulting universe is identical to ours.

This CPT symmetry is the highest level of symmetry that nature obeys at all fundamental levels. And that's how the concept of the time arrow remains to be one of physics' most mysterious problems of the universe.

Courtesy : http://thejupital.com

ECs' Got Talent: Articles

Unreal Engine 5 and MetaHuman

Soham Jani
(Roll No.: 18BEC041)

Since the launch of the NextGen gaming consoles like PlayStation 5 and Xbox Series X/S in the market, the world is shifting towards more advanced graphic designing technologies for creating more lifelike games, environments, and graphical models. Game Engines are one of the tools used widely by developers for purposes such as creating a movie/Advertisement, Designing a model for any flat/campus/building, and most importantly, developing games.

In the year 2020, because of the pandemic, the video game industry has grown to $57 billion in revenue in the U.S. alone while surpassing both the music and movie industries combined. The availability of high-speed internet connection and cloud gaming has also played a big role in providing accessibility to lots of people to play games who don't have a specific hardware like gaming console/PC. Cloud gaming has not been launched in India yet, but rumors have been floating around about Reliance Jio partnering up with Xcloud to bring cloud gaming in India with 5G technology.

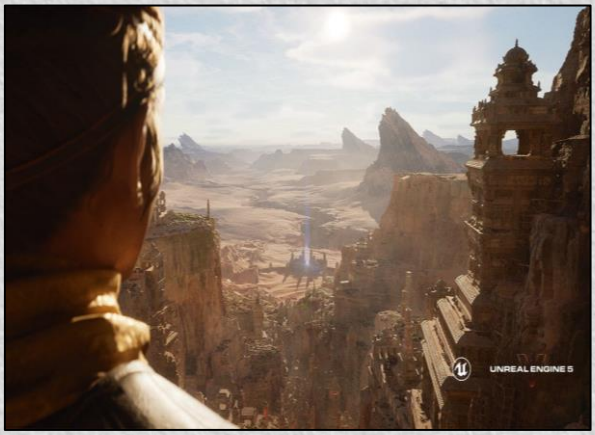
The release of new gaming consoles and graphic cards like Nvidia's 3080 Ti, 3090, etc. has provided the opportunity to the game developers to build games with more complex and highly detailed character models and environments while introducing more ways for the players to interact with different objects in the game world. There are various game engines which are free for people including Unreal Engine, Unity, CryEngine, Gadot, Armory, Corona (renamed to Solar2D), etc. Among these game engines, Unreal engine and Unity are most widely used in the industries and even for personal usage. Unity was good back in the days, but for 3D game development Unity can't be used for building very complex and graphically stunning games. Unreal Engine on the other hand gives developers the flexibility to develop games with lifelike graphics and real world mechanics and physics. Companies like Rockstar Games, Electronic Arts (EA), Naughty Dog, Ubisoft, etc. create their own game engines for developing their games to include additional details, mechanics and gradually update the engine for developing new games as well as provide updates to the previous games. For example, Grand Theft Auto V (GTA V), which is one of the most popular games uses Rockstar Advanced Game Engine (otherwise known as RAGE engine) and so does Red Dead Redemption 2.

Unreal Engine 4 is the current version of Unreal Engine which is developed by Epic Games and it is available for free to all the game developers, graphic designers and animators. Games like Gears of War (4 & 5), Godfall, Hellblade, Batman Arkham Games, etc. are developed using Unreal Engine 4. Unreal Engine 4 uses the scheme known as blueprints which are used for many tasks such as providing interactivity with the objects, behavior of any object, trigger events in the game and many more. The feature

of Blueprints doesn't require the developer to be familiar with languages like C# or C++. The developer can implement the desired event or behavior in the game without writing any program. Unreal Engine 4 also provides an additional facility to purchase various assets from the store which includes a wide variety of Static Meshes, Character models, Skins or Texture, etc. which are created by other developers.

Unreal Engine 5 is the latest version of Unreal Engine which is in its Beta phase. Unreal Engine 5 was revealed on May 13, 2020, in a video showcasing a Next-Gen Game-Demo which was running in real-time on a PlayStation 5. The first Unreal Engine 5 showcased the detailed environment and character model which was generated using billions of polygons made by triangles generated using nanite virtual texturing to generate various textures. The demo also introduced the new lighting technology proving dynamic illumination and natural bounce-back of the light from metal objects. It also showcased the focus on ray tracing technology used in Unreal Engine 5 for the developers to include ray-tracing effects in their games. The first look at Unreal Engine 5 gave an abstract idea of how the next-gen gaming will look and unlocked the potential to create a more interactive and fabulous-looking game world with Unreal Engine 5. Epic Games have confirmed the addition of all the new features to be added in Unreal Engine 5 to make the game development process easier for the developers and provide assists in implementing common and user-defined features in the games using blueprints.

In May 2021, Epic Games has launched the program for Unreal Engine 5 to test the new features of UE5 and implement the big fixes and refine the UI before the public release. The Early Access of UE5 included the showcased features of Nanite, Basic UI, plugins, features of super-resolution, ray tracing, etc. The early access demo of Unreal Engine 5 requires the Disc Space of 100 GB and system requirements include 8 GB of VRAM and 32 GB of RAM. The early access program lets the users experiment with different features of UE5. The project included with Unreal Engine 5 is called "Valley of the Ancients" which demonstrates the use of all the new features in Unreal Engine 5. The project also lets the developer get their hands on the new animation feature which is used for creating animation for the character even with the individual elements/sections of the whole mesh.



Courtesy: https://www.unrealengine.com/en-US/blog/unreal-engine-5-is-now-available-in-early-access

ECs' Got Talent: Articles

Recently, Unreal engine released their first game demo which is accessible for everyone to download only on the next-gen consoles like PS5 and Xbox Series X/S. The demo is called "The Matrix Awakens: An Unreal Engine 5 Experience" which is used as a promotional campaign for the recently released movie The Matrix Resurrections. The demo showcases the creation of the game world of The Matrix using UE5. It includes real-time processing and particle effects in the gameplay. The demo includes chase action chase sequences and free-roaming into the world which showcases the new particle effects, character modeling technology, Driving Mechanics, Effects of damage to the car, Lighting, and reflecting surfaces using both screen space reflections as well as Ray Tracing. Since it is available for free, people can download the demo and get a glimpse of the future of gaming with next-gen only graphics and gameplay of the games created using Unreal Engine 5. The following images are taken from PlayStation 5 running The Matrix Awakens which shows the real-time images of the demo and the character models which look realistic.

Courtesy: https://www.unrealengine.com/en-US/wakeup

After the conference of Facebook changing its name to Meta and introducing the Metaverse, people are looking forward to develop technologies for Virtual Reality and real life environment for Metaverse. MetaHuman Creator is a tool for creating photorealistic digital humans that are rigged and ready to animate in Unreal Engine. MetaHuman is still early in development and it is free to use with Unreal Engine. MetaHuman is tool is used for create digital humans with different facial details and expressions. MetaHuman can also be used for simulating different facial expressions and make the digital human talk and have identical facial expressions as a real human being. MetaHuman tool is also used to create the photorealistic model of Keanu Reeves

in The Matrix Awakens demo. The Matrix Awakens demo also showed the features of MetaHuman by showing all the different models of the protagonist of the movie, Neo. MetaHuman is still in early access and is currently developed as the future technology alongside Unreal Engine 5.

Courtesy: https://www.unrealengine.com/en-US/digital-humans

These were the two technologies namely Unreal Engine 5 and MetaHuman which is expected to be fully operational in all the industries like film making, gaming and designing by 2023. The availability of more powerful hardware with less price and requirements will increase the accessibility of these technologies to more people resulting into rapid development in the graphic designing, modelling and game designing software and applications.

APIs – The revolutionary connectors

Lalit Jetwani
(Roll No.: 19BEC047)

We often come across situations in our daily life where we find ourselves inaccessible to some people or resources that are important to us, in a direct manner. We need a medium that makes this communication possible. Let's understand this in a better way, with the help of an example.

Suppose that person A visits a restaurant. He runs his eyes through the menu and decides what he will like to have. Now, to get the desired food items A doesn't reach the kitchen of the restaurant. Instead, he calls another person, say B who is a waiter in the restaurant. B notes down the names of the food items that A wants and reaches out to the cook in the kitchen. As soon as the food is ready, B delivers the food to A.

Taking an analogy from this, we come to understand how the applications bring to us real-time data from the web and the role of APIs.

API stands for Application Programming Interface. It's like the waiter; and makes communication possible between a user–friendly application and the web. APIs are also used to make communication possible between two different applications. The examples where we use APIs in our daily lives are checking live scores of sports tournaments, checking the weather at the current location, checking the prices of the shares in the market or predicting them, etc.

When we break down the acronym, the understanding of APIs gets clear. Application refers to the various apps we use for ordering food, booking tickets, watching web series and movies, playing games, etc. The applications listed above are created by programming by the developers. Here comes the importance of programming. Lastly, the interface refers to the interaction between the two applications, being connected by the API.

Now, let's see the working of an API. Say A wants to have pizza for his dinner. He checks out for his favorite paneer pizza on the website of his favorite pizza company, Pizza Hut. Now, the data related to the availability, prices, delivery time, and charges are directly fetched from the website of Pizza Hut and displayed on A's mobile screen. On the other hand, if A looks for the same paneer pizza in the Zomato application, he may get various options from different pizza companies that fit his budget. What happens in the latter case is that an API fetches all the data related to paneer pizza from databases of different companies and brings it to the Zomato application, where A can see the options. In fewer words, API carries the request of the user to the server and the response of the server to the user.

There are a few different types of APIs:

1. REST APIs – REST stands for Representational State Transfer. REST APIs are used as web services to request data and receive the response from web servers using HTTP methods, namely GET, POST, PUT and DELETE.

2. SOAP APIs – SOAP stands for Simple Object Access Protocol, which is a predefined standard. SOAP APIs are more secure than REST APIs as they are based on XML-based systems, and are used in applications where a large amount of data is involved.

3. RPC APIs - RPC stands for Remote Procedure Call. They were designed to execute a code on a separate server and they are the earliest form of APIs.

Wondering why the APIs are required? Sometimes, when the information is available in excess, it leads to confusion. Everyone seeks the correct and precise amount of information. Based upon the request of the user, the APIs enable access to the best and right amount of information available on the servers. Moreover, the APIs take from the users only the information that is required to allow secure access to the web servers. Security of information that is taken from and available to the user is taken care of by the APIs.

The applications of APIs are numerous. People are well equipped with several apps that use APIs. For example, the APIs help the e-commerce business to provide the customers with several products with the best quality, in very little time. This is also the perfect

example of the case where APIs serve as a great mode of communication in the B2B industries.

There's a lot more than APIs can do. So the next time when you plan to go on a trip to a hill station and look for the flights in the travel applications or book a room in the hotel over there, an API will be there at the backend, playing its essential role.

What to seek from Life?

Manav Chokshi
(Roll No.: 19BEC068)

We, humans, tend to find meaning in everything. We don't do meaningless things. We are so into our Intelligence that we are being ignorant of the basic fundamental of existence. Finding meanings and logic gives us a better view and platform for understanding situations and various spheres of our Life.

Humans developed Logic for their own sake. We construct a logic for our understanding. Various people come up with various logic and solution for the same problem. Logic is helpful in Material World but the moment one tries to apply it to life, things go critically wrong. One may draw conclusions that are fatal and insane. Let's discuss a normal aspect. We are born and start our journey towards our own grave. It's a sure thing that we are ultimately going to die. Now logic says "What's the point in living if we are going to die ultimately no matter what we do", there is no point denying this statement. Logic continues "Why don't we end it now?" and this, also, can't be denied. Logic seeks safety and security; it favors the side which is reliable and so Logic will always choose Death because Death is certain.

Try to apply Logic in beautiful poems, ballads and song that are written by lovers around the globe over the period of centuries. Not a single line will make sense. Logic kills liveliness, it kills happiness. If you think that you will be happy if you travel all the places that you have written in your 'Bucket' list. Logic says "Go on, start earning and one day you will have enough to travel". Do this and you will know at the end you will not spend a single penny on travelling. Life is multi-dimensional; you can't earn it with Money. Writing down your 'Bucket' list is Life. Chasing your dreams is Life. The journey is Life.

Start searching for meaning and you will end up standing on your own grave.

Just think this way, if things were meant to be defined then wouldn't they exist along with their tags containing their meaning and purpose they serve. If we are meant to seek and find meanings then why are we born in darkest ignorance. Do not compare Logic and Knowledge. Knowledge is knowing the truth and truth is "Knowledge is Hindrance and Ignorance is Bliss". Just look at a new born child and her mother at the same time. You will know, child is in bliss and mother must be worried about her child. We all are cursed with knowledge.

So, cherish the company of those who you find on your way towards fate. Love is life, life is Love. Sole purpose of Lord Krishna's life was to show people how to Love. Share Love and it will grow exponentially within you. Love is blind and meaningless. Love is omnipotent and can travel across dimensions and not even science can validate that.

Ladder to Professionalism

Rishita Chaliawala
(Roll No.: 19BEC113)

"My daughter used to be very bright in the school, but in college, God knows what happened she is not studying at all and I guess she has been accompanying the wrong group of friends which always keeps her occupied with some work or the other", probably an Indian mother concerned about her child, complaining to a relative.

The journey from high school to college is a stepping stone from a child to a mature youngster. A nerdy child in school can transform completely into a notorious student in college. Wondering how this transformation occurred? What happened? Late teenage is a year where one learns to be self-caring, explore their area of interest, and be somewhat rebellious. College in Indian society is a mirage of non-studious and very chill organization. College can be all crazy and dope if one knows, how to manage both fun and study. Obviously, for education there are professors but for fun part there are friends and some students' organization also called clubs. We evolve every day. Even if we look back to a decision or an action taken 2-3 months back in impulse, we feel it to be embarrassing or immature. So, we can think how much a college or an organization can teach us in 4 years span of time.

Clubs and groups play important role in colleges or precisely in a student's life. Most people see these clubs as groups for fun and games. These groups are actually mini corporate world. These are students' firm where they learn and implement skills like leadership, management, co-operation, politeness basically whatever one need for entering into corporate world.

On the outside, people only see that they are just playing along with events and fun stuff, but on the inside these students are learning organization, planning, networking and business. Productive and active organization helps us to explore and develop our hidden talent or removes glasses from our eyes which we thought were useful but in reality, they were blur and misleading.

Clubs are almost like corporate except corporate is way too harsh. Clubs consists of helpful seniors and they are always to guide while superiors in corporate are rude and more arrogant to their subordinates. One has to learn tolerance for handling such bosses which at college level is bit hard to learn yet self-growth and maturity in one can be of

succor. Corporate world is very professional, there friendships are hard and enmity is considered as competition.

Everyone here, wants to take a job or open a start-up but will their dreams be fulfilled just by dreaming them. Unless they work on themselves, come out of their comfort zone, they can't transfer their dream into reality. Things don't get served in gold plate unless you work hard to earn it.

Prospective Hindsight – Get comfortable with stress

Maharshi Dharmesh
(Roll No.: 20BEC061)

Ongoing development in the public, education as well as industrial sectors demands a workforce and an innate level of skill force too. While observing the growth in these sectors we are also witnessing a much higher increase in stress levels in both personal and professional virtue. These have now taken an ugly form where some would like to describe it more as " Anxiety Attacks ". These said attacks happen when one is expected to perform best under a given challenge. These challenges can be in the form of Business pitching, competitions, conferences, and something as normal as catching a scheduled flight. However, these stress signals and fears won't do any good in the above case. In a scientific sense, your brain releases cortisol which increases heartbeat, modulates your adrenaline level, and clouds your thinking as well. Let's understand this more precisely, a pianist will practice a piece numerous times before recording his/her final performance. However, he/she is more likely to skip a note or make a mistake during the recording compared to practice sessions. While many pianists play flawlessly, again this requires immense practice. To understand why this happens is on the fact that one tends to unconsciously focus on making mistakes while performing which kind of deters one full potential.

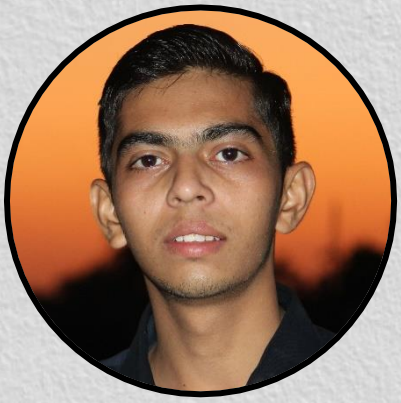
There is a good saying - "If you fail to plan, you plan to fail". Daniel Levitin in his ted talk on "how to stay calm when you know you'll be stressed" suggests a simple yet efficient technique to address the problem. Prospective Hindsight also called the pre-mortem, is when one tries to figure out what could go wrong and also tries to prevent those things or in simple words minimize the damage. It highlights the question " How far the things could go wrong " - by thinking this question one make a constructional mindset to pin down each of these legends that make things go sideways. Not just this, but there is another extension of this technique. Often, we tend to get wandered off or lose the most important things in stressful/hasty situations like vital documents, keys, wallets, cards, etc. particularly when they are most required. This can be avoided by practicing pre-mortem in some form. We will first discuss the obvious ones. Around the home, designate a place for things that are easily lost. Now,

this sounds like common sense, and it is but there's a lot of science to back this up, based on the way our spatial memory works.

There's a structure in the brain called the hippocampus, that evolved over tens of thousands of years, to keep track of the locations of important things - where the well is, where fish can be found, a place where through which squirrels find their nuts. This exquisitely evolved mechanism in the brain for finding things. But it's really good for things that don't move around much, not so good for things that move around. So, this is more of a proof of concept. It serves the chief purpose of its Apple counterpart, which is to find stuff.

The ultrawideband that Apple is using is one of the key technology for precisely finding the device. Implementing it is not as simple though. Power consumption is fairly high, Arduino UNO is overkilling. I found the nRF51822 which has BLE, an 8-bit low-power MCU, and BMS built-in, exactly the device I was trying to make. Making something a tech giant has built was so much fun!

Life, Optimism & Sadness



Sanjaykumar Parmar
(Roll No.: 18BEC069)

What is Life? Are you satisfied & happy with your life? Have you ever asked yourself these questions ? Did you get the right answer? People say Life is a Challenge, Life is an opportunity, Life is an adventure, a mystery, a tragedy and many more. But did you get any proper definition of life ? Mostly no. But according to Buddhism it is to be believed that "*There is only sorrow everywhere in this world*". Upto some extent it is also true and we can also relate it to our real life.

Now you will have one more question: What is the definition of sorrow? *It is the situation where the expectation & reality of any individual doesn't match with each other.* Someone's sadness is worthy while the others are futile. Some are sad about their own loss, while some about others' success. Even the one who doesn't seem to be sad from the outside is also sad from inside. So, Overall there is only sorrow everywhere in this world.

In reality, we human beings are very optimistic in nature and hence we want everything to happen in our favor only. We always expect that everything will happen according to our desires & our desires never end. And many times it doesn't go in our favor but one thing is for sure that anything that happens with you is for some good cause only, you might not realize it at that time but later stage definitely you will.

There is one theoretical law called "**Murphy's Law**" which most of us can relate to. It states "*Anything that can go wrong will go wrong.*" or in other words "*The more you fear*

something the more it will happen". When things are going well, not much is made of it. But when things go wrong in life, we look for reasons. However, there is no evidence to support Murphy's Law – it is all based on perception. The law captivates our attention. There will be uncountable examples to support Murphy's law, Bread when dropped, will always land butter-side down. As soon as you wash your car, it will rain. When queuing, the line behind you will always move faster etc. What could be the solution to it? People who understand Murphy's Law can use it to mentally prepare for the unexpected problems and challenges that life throws at us. Murphy's law assists us in analyzing and planning for the future. It aids project planning by analyzing risk. It incorporates practical artistry by discovering a different way of thinking and preempting something going wrong. It practically prepares us for plan B.

Courtesy: https://www.topdreamer.com/

Finally, I can conclude that being optimistic about life is good up to some extent as it keeps us motivated to reach our goals, but sometimes being over optimistic may lead us to depression through continuous sadness.

Exploiting Rights, The Right Way

Yash Purohit
(Roll No.: 20BEC137)

The modern world, society of the 21st century demands democracy as a right, not just to survive but to enjoy the best living standard. It presents a whole set of duties and rights to an individual to attain the best he/she is capable of. More than half of the world is presently flourishing under the shade of rights provided by the tree of democracy. Here, it is quite dejecting that the remaining, even though having an equal right to get the same development as others, is unable to bring it about, due to some very unfortunate reasons. But what about the first portion, that has received all the benefits of democracy? Is there any proper ministration, so that the rights are exploited in a controlled manner? It is quite wretched to deduce that the answer to this question is negative.

The amount of carelessness and ignorance in the common attitude has risen, and the recent events have been a witness of this. Under the umbrella of fundamental rights, some societal elements are engaging in activities that are undermining the ideals of democracy. Freedom of speech and expression, which was brought about to amplify the suppressed voices, is now being used as a shield to instigate a feeling of hatred among

the community. Freedom of religion that was originally promoted as a bearer of equality among people, is now being misused to carry out unethical pursuits. The major reason behind this is that people have now become negligent of others. Technology is bringing the world closer, but emotionally people are receding away, making them impervious to such situations around them. Countries like India were under slavery and torturous administration for ages, but they fought back being united and eventually achieved the pedestal of democracy on which the country was placed. This pedestal is held together by both rights and duties together, and the misuse of any one of these would result in blows to the pedestal, which would eventually shake the entire foundation of the country. The solution of a problem is equally important as understanding the problem. Fortunately, in this case, it is just at the initial stage, and also not that hard to be solved. Democracy is built and nurtured upon qualities and having a sense of situations, thereby acting reasonably upon it. Everybody has a very own democratic bubble within which one is free to enjoy the bestowed rights the way he/she wants but most importantly one needs to realize that it doesn't extend up to infinity. There are others as well and are equally salient. A common understanding has to be developed among the community stakeholders such that even if one goes to forty, the other may try to achieve sixty so that a perfect hundred can be made. If quality growth is ensured, equalizing everyone, dropping ignorance from the common attitude, it would necessarily aid the strength of the foundation of a democratic country.

Rights can be considered as the dessert of democracy. They happen to be sweet and enjoyable, but excess of it may result in troublesome situations. These are for all, and certainly equal for all. Thus, enjoying them in the right way would be the best for every individual developing within a democracy.

ECs' Got Talent: Poetry

Vaqt – Time

आसमान भी वक्त का गुलाम है,
वक्त उसे भी बदलदेता हैं।
बदलाव!!, कहने को सि र्फ चार अक्षरों का छोटासा लफ्ज़।।
ये दूसरों में दि ख बड़ी आसानी से जाता है,
पर जब खुद पर बात आती है, तो मालूम होता है। बड़ा अजीब है ये एहसास। कि सी कारीगर की तरह खुद के वजूद
पर रोज़ हथौड़े और छैनी से मार-मार कर नींद से ले कर दैनि क आहार ,हर जज़्बात, हर वि चार को तोड़ मरोड़कर
आकर देना, तकलीफ देय होता है।।
पर तज्जुब वाली बात होती है की यह तकलीफ,
उस हादसे की तकलीफ से बोहोत काम होती है,
जि सने हमें बदलने पर मजबूर कि या।।
या काहू वक्त अनंत आसमान से भी बलवान है,
वह जिदा भी है ,बेजान है।
उसने तोड़ा बोहोतो का अभि मान है,
और हां असमान भी वक्त का गुलाम है।।

–

The sky is slave of time,
It turn red, murdered a day,
committed a crime.
Its changes it colour, we say the rainbow is colourful
But ask the land the sky changes it colour more.
Without knowing the reason , for what it's changing for.
Change is easy to see in someone, but hard to make it on own.
And i guess it's a fact well known.
Making a sculpture from an old one, but the catch is the old one is dead but still alive

- Devang Bathwar (20BEC016)

ECs' Got Talent: Poetry

शुरुवात

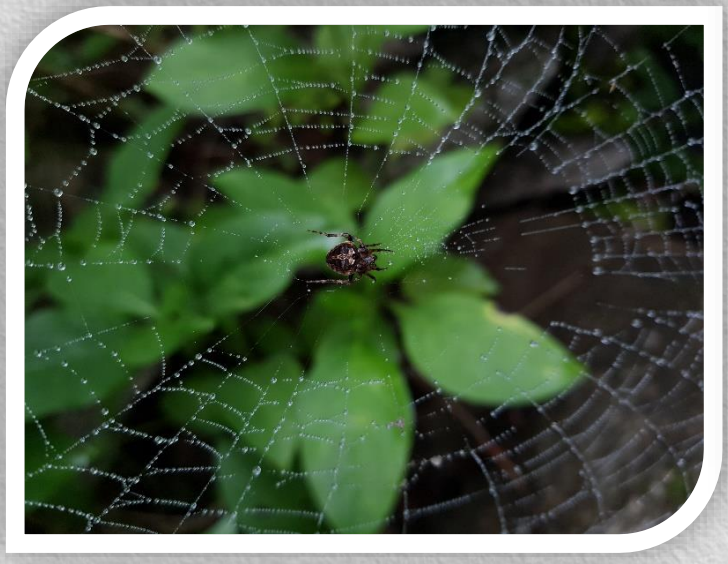
चल न पाए कदम जब आगे की ओर तुम्हारे,
थक कर रुक जाओ जब, कोशिशें जब काम न आए तुम्हारे,
सब्र रखकर उस लम्हे को भी जी लो जरा,
हार का स्वाद खुशी के साथ चख लो जरा,
दिखने लगे सब साफ साफ जब, होजाओ जब तयार तुम,
हिम्मत वपास भरने लगे तुम में, तब फिर उठना तुम,
तब फ़िर उठना तुम, एक नई **शुरुवात** करना तुम।
शुरुवात एक नए सहस की,
शुरुवात एक नए आत्म-विश्वास की,
शुरुवात एक हिम्मत भरी, शुरुवत नई मंजिल की ओर,
शुरुवात जिससे खुशी मिलेगी, संतुष्टि उड़ेगी पर फेलाया
आसमान की ओर,
शुरुवात नई होगी, पर आँखों में मंजिल वही होगी,
रास्ते अलग, कोशीशें भी अलग होंगी, पर ज़ेहन में तड़प वही होगी,
थक जाओ तुम, थम जाओ तुम, बस हार मत जाना तुम,
राह बदलना मंजिल नहीं, बस ऐसे मोड पर नई **शुरुवात** करना तुम।

~ Lalit Jetwani (19BEC047)

ECs' Got Talent: Photography

Harsh Chotaliya
(20BEC039)

Yash Viradiya
(20BEC135)



Harsh Chotaliya
(20BEC039)

ECs' Got Talent: Painting

Krisha Sheth
(20BEC115)

Yash Viradiya
(20BEC135)

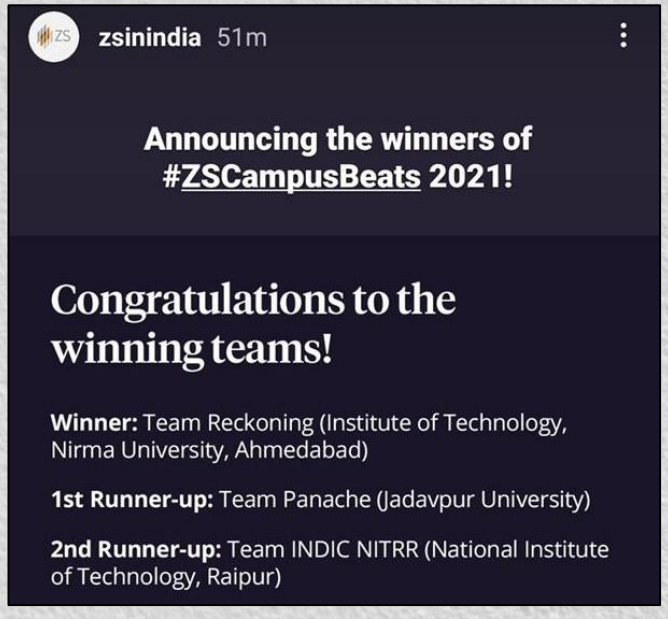
Krisha Sheth
(20BEC115)

Students' Achievements

1. Anshul Kaushal Dani (Roll No.: 20BEC009) of B.Tech. Semester - 3, was given a seat to represent as a delegate of the country Lithuania under the United Nations World Tourism Organization in the IMUN Online Conference from July 31, 2021 to August 1, 2021, and he debated with around 140 delegates from different countries in from, on the topic "The Tourism Sector reviving after the COVID-19 pandemic", and was awarded the Honorary Speaker of the Week for his speaking skills. He got a Certificate of Honorable mention of UNWTO in IMUN Online Conference.

2. Yaman Parmar (Roll No.: 18BEC070) of B.Tech. Semester - 7, secured First position in the event Online Patriotic Solo Song Competition "Deshraag", organized by the NSS Unit and Students Welfare Board, Nirma University, on August 13, 2021, under the "Azadi Ka Amrit Mahotsav".

3. Hard Rokad (Roll No.: 18BEC090), Rishika Patwa (Roll No.: 18BEC087), Sanskriti Mishra (Roll No.: 18BEC095), and Sarthak Farkya (Roll No.: 18BEC096) of B.Tech. Semester - 7, participated in the ZS Campus Beats Challenge 2021, during March-April, 2021 and secured the First Position.



4. In the Smart India Projecthon 1.0, jointly organized by the Atal Incubation Centre - EMPI, guided by NITI Aayog, Government of India, and the Innovation and Incubation Cell, Bundelkhand Institute of Engineering and Technology, Jhansi, the team of 3 members: Palak Naik (Roll No.: 20BEC077), Riththika Sukanandan

Students' Achievements

(Roll No.: 20BEC102), and Sahaj Soni (Roll No.: 20BEC106) from B.Tech. Semester - 3, secured AIR 1 in the competition held from September 6-16, 2021. The idea presentation was on the topic "Indoor Air Purification through 4th State of Matter".

The product is an air cleanser. It not only purifies the air from particulate matter but also from microbial matter and refreshes the environment by releasing negative ions which improve your mood and your productivity. With this air cleanser, you experience the air that you breathe at hill stations and beaches directly in your homes and offices. The team's idea and product was very well received and they have been incubated by the Atal Incubation Center, Government of India.

5. Khush Shah (Roll No.: 19BEC120) of B.Tech. Semester - 5, has been declared as the Country Winner and achieved 4th Rank at the Global Level in the AI Global Impact Festival 2021, organized by Intel®, and he had presented his idea on the project title "REC Governance using AI".

Upcoming Events by the Department

Research Avenues in VLSI Design

The Electronics and Communication Engineering Department, Institute of Technology, Nirma University is organizing a two days webinar on "Research Avenues in VLSI Design" during February 18 – 19, 2022.

Website:

https://sites.google.com/view/ravd-21/home.

The program is intended for Ph.D. aspirants, Ph.D. scholars, Ph.D. guides, faculty members from Engineering colleges, M.Tech. Student Researchers, and Engineers from industry.

Advancement in Communication, Electronics, Computer and Automation Technology (ACECAT)

The Department of Electronics and Communication Engineering is organizing an Exclusive Student Conference (2nd National Conference on "Advancement in Communication, Electronics, Computer and Automation Technology" ACECAT - 2022) for students of UG, PG and Ph.D. programs. The Conference is to be held during April 08-09, 2022 in Virtual Mode. All important details about the conference can be found at: https://sites.google.com/nirmauni.ac.in/acecat/home.

ACECAT 2022 aims to promote research-based innovations in the fields of Electronics and Communication, Instrumentation, Computer Science and Information Technology. We have with us Industry experts and Researchers who will enlighten the participants and will share ideas and experiences surrounding ACECAT.

Upcoming Events by the ECO

The Electronics and Communication Students' Organisation (ECO) has been actively working for the development of the student community. During the pandemic Situation also, the organisation has worked throughout the year for the betterment of the students. In the past, ECO had organized various technical and non-technical events, webinars, interaction sessions with the student community for the overall growth of the students and bringing out the most from them. To continue the tradition of learning and development the team ECO wishes to put forward some tentative Upcoming Events for the students.

Placement Mantra

Placement Mantra is an event for all the Semester - 4 and Semester - 6 students of the Electronics and Communication Engineering branch in which there will be a one-hour session every weekend for two weeks, on various domains and the students will get information about placement opportunities, internships, and abroad studies. It will be held in March and the event will happen on weekends for two weeks. It is an interactive session cum event where the students will also be given time to ask questions regarding placements, internships, or abroad studies.

E-Chess (ROOK N ROLL)

An Online Chess Tournament will be organized for all the chess experts of the university tentatively in September 2022. The tournament will be held on Lichess or chess.com. This will be an amazing opportunity for all the chess enthusiasts to compete in this tournament and grab amazing cash prizes.

Image Source: https://bit.ly/35lnlaB

Upcoming Events by the ECO

ECO Day

ECO Day is another flagship event of the Electronics and Communication Students' Organisation (ECO). It will be a 2-3 days long Techno-Management event for all the students of all the universities of India as well as all the faculties of the Nirma University. The ECO Day will be kind of like a fest and the students will decorate the whole campus. The ECO Day will consist of various events like Technical, Non-Technical events as well as workshops and webinars where the students of any discipline irrespective of year of study can participate, enjoy and grow their inner skills.

Code Cook

Code Cook will be an online Coding Event for all the freshers and sophomores of the Institute of Technology. It will be composed of one round only with five to seven questions of different difficulty levels. This will be a great opportunity for all the coding experts of the college to perform their best, use their logic and skills to solve the questions as early as possible. The participants completing all the questions first will be declared as the winner and cash prizes will be awarded to all the winners. Source: https://elink.io/p/9cadfcf

Credits Section

Image Courtesy:

Vision & Mission - Pallav Rathod (Roll No.: 19BEC106)

Preface & Poetry - Aatman Patel (Roll No.: 19BEC091)

ECO Website:

The Electronics and Communication Students' Organisation (ECO) has recently launched its official website which contains details of ECO, glimpses of events, ECO board members, etc. Visit the link to explore more: https://eco-itnu.me/

Memories of B.Tech. EC (2018 – 22)

Memories of B.Tech. EC (2018 – 22)

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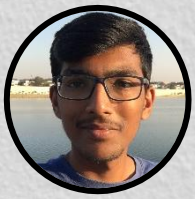

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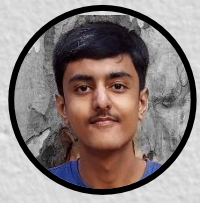

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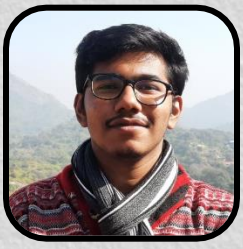

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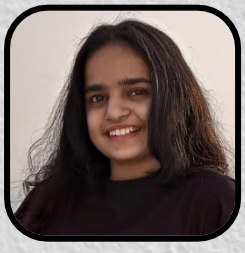

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