FLASH

Electronics & Telecommunication Engineering
Departmental Newsletter

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VISION

To evolve into a Holistic Learning Hub that moulds technologically proficient engineers in the field of Electronics and Telecommunication; contributing to the global industry and society with Integrity, Ethics and Professionalism as envisaged by Don Bosco
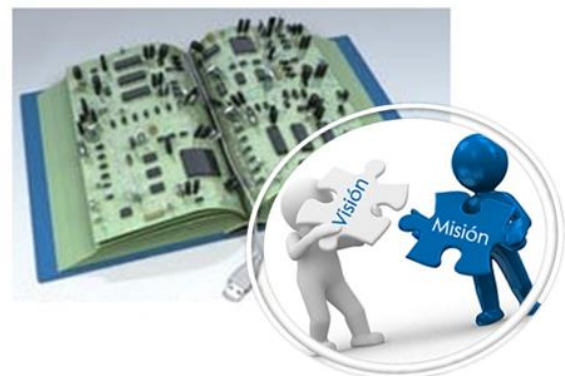
MISSION

- To impart education abreast with the fundamentals and advances in technology and transform students into globally accepted professionals
- To foster networking with all stakeholders for promoting technical innovation, research and entrepreneurship
- To encourage various skill enhancing activities and extra-curricular activities to instill high levels of work ethics and responsibility for a better society

DEPARTMENTAL DETAILS

The Department has well qualified and experienced faculty in the areas of Electronics & Communication, VLSI, Embedded, Signal Processing, Automation and ControlEngineering. The Department offers Bachelors of Electronics & Telecommunication Engineering programme, with total number of 60 seats in the 1st year and 12 seats for lateral entry into the second year.

The department has been organizing various programs to enhance the Industry -Institute interaction through field visit and workshops.Every year students of Third year and Final Year are exposed to Industry through internship programme of 1 month duration for industry experience.
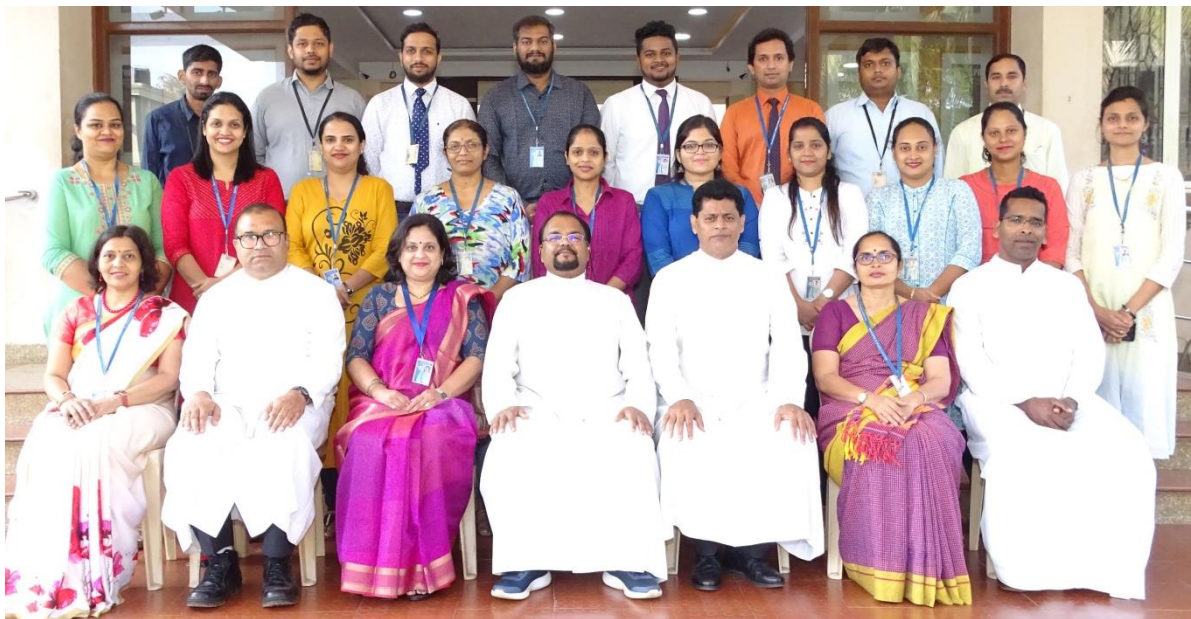
Department has 12 fully functional Laboratories as listed below, along with the different Software.

- Embedded Lab
- e-Yantra Robotics Lab

➢ **LABORATORIES**
  - Electronics Engineering
  - Power Electronics and Control Systems
  - Devices and Circuits
  - Communication Engineering
  - Microprocessor
  - Electrical Engineering
  - Electrical Technology
  - Digital Systems and Electronic Instrumentation
  - Signal Processing Lab
  - Advanced Communication Lab

SOFTWARES	KITS
MATLAB	8051 kits
Xilinx 14 Version	ARM kits
OSCAD	PIC kits
MAGIC	PLC kits
LabVIEW	LAN Trainer kits
OCTAVE	OFC Kits
POlSARPro	PSoC ARM Cortex Kits

R&D Knowledge sharing Initiative

Knowledge Sharing Session - 24th November 2020

The ETC Department had its first Knowledge Sharing Session, under the R&D cell on 24th November 2020 from 3:30 to 4:30 pm in Seminar Hall 2. The Knowledge Sharing Session initiative involves two activities namely a Technical Paper presentation and some recent trends whose main motive was to update Faculty members with the latest trends in Technology and Research.

Prof. Mohini Naik gave a talk on recent trends in Millimeter wave applications. She explained the basics of electromagnetics, its spectrum and its applications. She also explained about recent 5G requirement and its impact on the mankind. She also explained about the millimeter wave frequencies that can be used to design 5G antenna and other components, current research areas in mm wave band.

Prof. Yeshudas Muttu presented an IEEE paper titled "Effective Face Detection, Feature extraction & Neural Network-based approaches for facial expression recognition", under the Image Processing & Artificial Neural Network Domains. Face detection and its feature parts using the Viola-Jones algorithm and some feature extraction algorithms were explained in detail.

The event was encouraged by R&D Chair Dr. Varsha Turkar and coordinated by Prof. Flavia Leitao. Both the sessions was knowledgeable & received good feedback from the audience.

Knowledge Sharing Session - 15th Dec 2020

The Department of Electronics and Telecommunication organized its monthly Knowledge Sharing Session, under the R&D cell on 15th December 2020 from 10:30 to 11:30 am in Seminar Hall 2 (first floor). The Knowledge Sharing Session initiative involves two activities namely a Technical Paper presentation and some recent trends whose main motive was to update Faculty members with the latest trends in Technology and Research.

The first session was taken up by Prof. Kimberly Moraes and the second session Prof. Priyanka Padiyar.

Prof. Priyanka Padiyar presented a paper titled "A Comparative Study of Wavelet based ANN and classical techniques for Geophysical Time Series Forecasting", under the Signal Processing & Artificial Neural Network Domains. She began with the importance of Wavelet Transform & its scope in the future. Time Series Forecasting models such as W-ARIMA, W-Kalman Filters and W-ANN were discussed in detail.

Prof. Kimberly Morais presented a technical talk titled "Understanding your Electricity Bill", under the Electrical Engineering category. She began with how she came up with the idea. She broke the electricity bill into five parts and explained each part. The bill consists of consumer details, electricity connection details, and consumption details.

The event was encouraged by R&D Chair Dr. Varsha Turkar and coordinated by Prof. Flavia Leitao. Both the sessions was knowledgeable & received good feedback from the audience.

FDPs Conducted

FDP on "Google Classroom"

A Hands-on Workshop on Google Classroom was conducted by Prof. Yeshudas Muttu for Faculty members of Electronics & Telecommunication Engineering in Signal Processing (E9) Laboratory on 16th July 2020. The main objective of this Programme was to make our teaching more productive, collaborative & meaningful.

Initially, Prof. Yeshudas Muttu briefed the participants about college G-Suite account & provided practical experience on Google Classroom. This was followed by creating a classroom, managing coursework in the classroom, adding students to the classroom that boosts collaboration & develops communication between Student & Faculty member.

The four main tabs of the Google Classroom, namely: Stream, Classwork, People and Grades were explained in detail. Prof. Yeshudas Muttu emphasized more on adding material to the classroom & demonstrated by adding Web link, YouTube Search Video & link, file from Google Drive & Desktop.
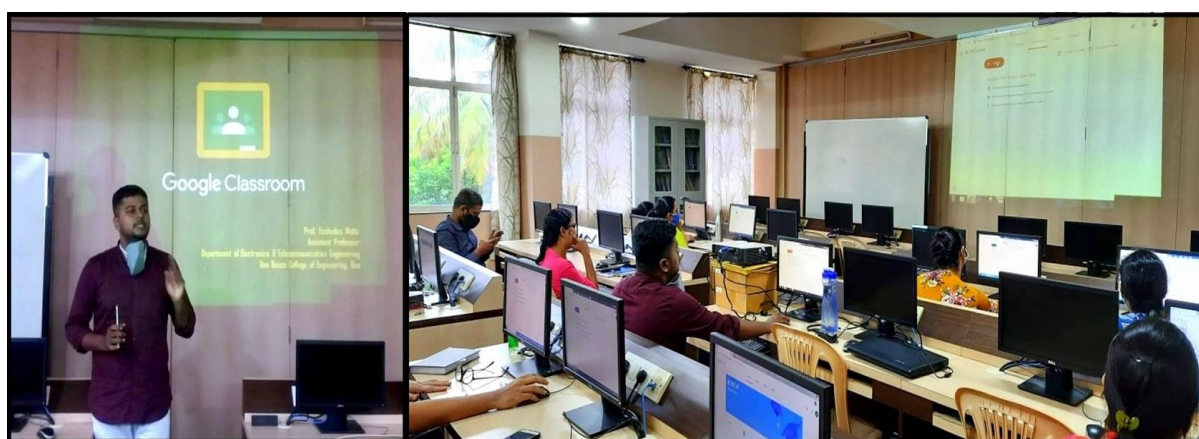
Later, the participants were engaged with creating & scheduling the assignments/Quiz assignments for the students. Forming Rubrics file for evaluation of assignment was also shown. Prof. Yeshudas Muttu explained about the Grading of assignments by adding the participants as student to the Google Classroom.

The workshop concluded with Linking Google Classroom with Google Meet Platform using Google calendar on Classwork Tab that will provide the feeling of Virtual Classroom for Students as well as Faculty members. All the faculty members created the Google Classroom for their respective Subjects & Classes that will definitely provide smooth functioning of teaching process.

FDP on "PCB Design and fabrication"

The ETC department of DBCE in association with FiiRE (Forum for Innovation Incubation Research and Entrepreneurship) conducted a one day Faculty Development Program (FDP) on "PCB Design and Fabrication" on the 19th August, 2020. The core objective of the workshop was to equip the faculty members with a set of skills and potentiality to undertake projects in PCB Design. The resource person for the workshop was Ms. Flavia Leitao, Asst. Prof of ETC Dept, DBCE.

The workshop started with an introductory and interactive talk on single and multilayer PCBs, an overview on Soldermask, Silkscreen and the different stages of PCB Design.

The faculty members were given a hands-on training on Eagle Software, where the instructor took them step by step through Schematic creation, ERC, BOM generation, Layout design, and DRC. This was followed by Gerbers and G-Code generation using Nvis Software which is required by the Nvis72 PCB Prototype Machine. They were taught to generate Gerber and G-Codes for Milling, Engraving, Routing and Drilling, which were then imported to the PCB Prototype Machine. The Director Rev. Fr. Kinley D'cruz and Principal Dr. Neena Panandikar appreciated the efforts of Prof. Flavia Leitao in organizing the workshop and urged the faculty members to take it forward and provide their consultancy services in this domain.
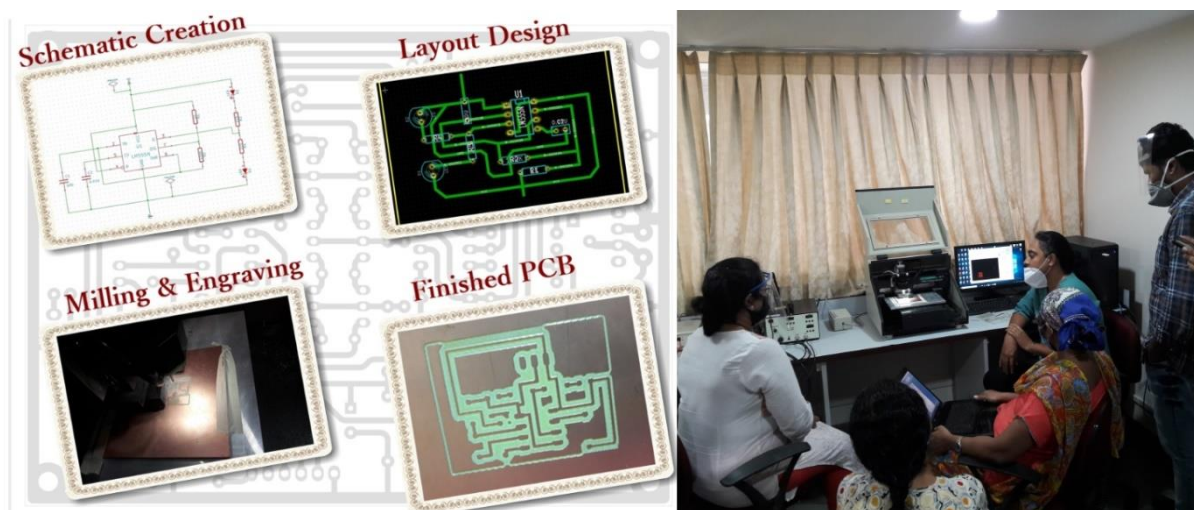
One Week Online ISTE Approved, Faculty Development Programme on "Recent Trends in RF and Microelectronics"

A One Week online ISTE approved Faculty Development Programme (FDP) on "Recent Trends in RF and Microelectronics", was organised by Department of Electronics and Telecommunication Engineering, Don Bosco College of Engineering and Department of Electronics and Communication Engineering, National Institute of Technology, Goa from 31st August 2020 to 4th September 2020.

Around 100 participants attended the FDP from all over the globe. The FDP commenced with the inaugural ceremony in the presence of our Director Rev. Fr. Kinley D'Cruz, Principal Dr. Neena Panandikar, Dr. Varsha Turkar, Head of ETC Dept. DBCE and convener, Dr. Vasantha M.H., Registrar, NIT, Goa and co-convener for this FDP and faculty members of DBCE and NIT, Goa. The host for the inaugural ceremony was Asst. Prof. Samantha Cardoso.

The coordinators of this FDP were Asst. Prof Trima P. Fernandes e Fizardo, Asst. Prof Samantha Cardoso from DBCE, Dr. Pragati Patel, Dr. Lalat Indu Giri from NIT, Goa. The members of the broadcasting team were Prof. Yeshudas Muttu, and Dr. Shreyas Simu.

The First Speaker of the day was Mr. Puneet Kumar Mishra, Scientist, Indian Space Research Organisation, Chair IEEE Bangalore section. He enlightened us on Satellite Configuration, Design, Assembly, Integration and Testing. The second session was conducted by Dr. Satyanarayana Bheesette, Scientific Officer (H) at Tata Institute of Fundamental Research, Mumbai.

The second day commenced with the session on "Design of High Speed Comparators", delivered by Dr. Nithin Kumar, Assistant Professor and Head of Electronics and Communication Engineering, National Institute of Technology, Goa. The afternoon session of the day was delivered by Dr.Milind Mahajan, Director, Antenna Systems Group; ISRO-Ahmedabad. He explained the spacecraft Antenna Design and Development Challenges.

The day 3 commenced with a session on Design of Gm-C based low power continuous time filter, delivered by Dr.Vasantha M.H, Associate Professor, Department of ECE, NIT Goa. He explained how Gm-C filters can be designed to offer higher bandwidth if the dynamic range requirement is relaxed for the same power.

The afternoon session of the day was delivered by Dr. H.G. Virani, Professor and Head of Electronics and Telecommunication Engineering, Goa College of Engineering, Farmagudi. He elaborated on trends in Integrated Circuits.

The fourth Day session was delivered by E. Mallikarjun, Assistant Professor, Department E&C, National Institute of Technology, Goa. The session was on Non-destructive evaluation of concealed objects via microwave imaging applications, inverse formulations, regularization methods numerical results and future direction.

The afternoon session was conducted by Prof. Mohini Naik, Assistant Professor, Don Bosco College of Engineering, Fatorda. She spoke on her research area of Millimeter Wave Antennas. The final session for the day was delivered by Dr. Pragati Patel, Assistant Professor, Department of Electronics and Communication Engineering, National Institute of Technology, Goa.

The final day commenced with a talk on Design of Matching Networks for RFIC Application, delivered by Dr. Anirban Chaterjee, Assistant Professor, Department of Electronics and Communication Engineering, National Institute of Technology, Goa. The afternoon session was delivered by Dr. Lalat Indu Giri, Assistant Professor, Department of Electronics and Communication Engineering, National Institute of Technology, Goa. He enlightened us on Thermal Imaging for Biomedical Instrumentation and Agriculture Electronics.

DBCE Remote centre for IIRS-ISRO

Don Bosco College of Engineering is the remote centre for conducting the outreach programs by Indian Institute of Remote Sensing (IIRS) from July 2020. The Indian Institute of Remote Sensing (IIRS) is a premier institute for research, higher education and training in the field of Remote Sensing, Geoinformatics and GPS Technology for Natural Resources, Environmental and Disaster Management under the Indian Department of Space.

Objective of this outreach program is to provide an opportunity for individuals to learn Remote Sensing and Geoinformation Science for the benefit of their professional career. Courses in Remote Sensing and Geoinformation Science will allow graduates to build their knowledge and practical expertise in RS and GIS technologies with independent study and project experience at the certificate level.

IIRS ISRO E-learning platform offers different courses such as Basics of Geocomputation and Geoweb services, RS & GIS Applications, Geographical Information systems, Understanding of Coastal Ocean processes using RS & Numerical Modelling, Global navigation satellite systems, RS & Digital image analysis, RS Applications in agricultural water management and many more.

Till date DBCE has enrolled for 11 courses. Out of 11, 9 courses are completed and 2 are ongoing. More than 80 students are enrolled for all the above mentioned courses from all over the country. To encourage the program, IIRS also provides the certificates for the Institute and the coordinator for each course.

Prof. Mohini Naik, Asst. Professor at ETC Department is the Coordinator for the IIRS-ISRO Outreach Programs. This program was initiated under the guidance of Head of ETC Department Dr. Varsha Turkar and received a lot of support from Director Fr. Kinley D'Cruz, and Principal Dr. Neena S.P. Panandikar.

STUDENT'S CORNER

Workshops/Seminars/In-house Trainings/ Project Exhibitions

NPTEL Awareness Program 2020

A NPTEL awareness program was conducted for the students of ETC on 15th July 2020 via online mode through Google meet. A total of 100 students attended the session.

Dr. Neena Panandikar (Principal-DBCE), Delivered a welcome talk and encouraged the students to enrol NPTEL courses based on their subjects. Prof. Vidhya NPTEL SPOC gave overview of NPTEL courses regarding enrol, filling exam forms and Domain areas for ETC students. Prof. Michelle Araujo e Viegas delivered session on MOOC courses for second Semester ETC Students.

Orientation Program for SE ETC students

An orientation programme was organized for SE ETC students on 12th September 2020, through the Google meet platform. The orientation was conducted with the intention of welcoming the students to the ETC Department and introducing them to the various technical and non-technical activities carried out by the department.

The introductory address was given by the Class Teacher, Prof. Trima P. Fernandes e Fizardo. Prof. Mohini Naik gave a brief overview on Student Satellite Club-Parikrama, Antenna Research Group and Indian Space Research Organisation (ISRO) Outreach Programme. Prof. Flavia Leitao introduced e-Yantra lab to the students which is a project hosted by IIT Bombay to spread education in Embedded Systems and Robotics in colleges across India and sponsored by MHRD. Prof. Deron Rodrigues briefed on Don Bosco Electronics and Telecommunication Society (DBEATS), which is ETC student association. This was followed by an overview of IETE (Institution of Electronics and Telecommunication Engineers by Dr. Shreyas Simu. Prof. D.S. Vidhya gave a brief session on accreditation and NPTEL courses. Prof. Yeshudas Muttu introduced the students to IEEE student branch.
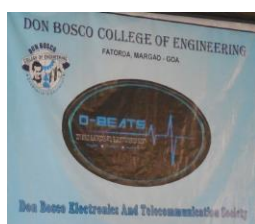
STTP on "5G Wireless Communications & Antenna Design using MATLAB & Simulink"

With an objective of providing an exposure to fundamentals of MATLAB and Simulink for Computation, Signal Processing, Hardware Interfacing, Antenna design and design of 5G Wireless Technologies, a 5 day online short term training programme titled "5G Wireless Communication and Antenna Design using MATLAB and Simulink" was organized on 11th, 12th, 17th, 18th and 25th August 2020, by DBCE Student satellite Club-PARIKRAMA in association with IEEE Students branch, technically sponsored by IEEE Bombay Section WIE (Women in Engineering) Affinity Group.

The short-term training was attended by researchers, academicians, industry professionals, and students not only from India but also from all around the world. A total of 817 participants registered, out of which 184 were International participants. The sessions were organized via online platform and the resource persons were: Mr. Suraj Gawande, Senior Application Engineer, DesignTech systems Pvt. Ltd. and Mr. Uvaraj Natarajan, Senior Application Engineer, Wireless Communications at MathWorks India Pvt. Ltd.

On day one Mr. Suraj Gawande delivered a session on Fundamentals of MATLAB. This session covered 'Introduction to MATHWORKS Product Family', 'From raw data to actionable insights with MATLAB Analytics', 'Toolboxes used in MATLAB' etc.
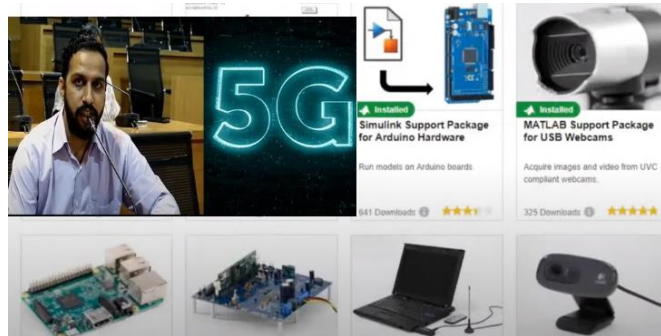
Introduction to Simulink Fundamentals was the session for day 2 and it was delivered by Mr. Suraj Gawande. Introducing Simulation and Model based design using Simulink, the resource person provided a detailed description about Simulink Graphical Environment. He further presented the various toolboxes, blocks, and signals in Simulink Libraries.

The focus of day 3 was on designing stand-alone antennas and antenna arrays using the Antenna Toolbox in MATLAB. The session titled Antenna design using MATLAB was delivered by Mr. Suraj Gawande. Briefly speaking about the challenges of antenna design, he discussed the Antenna toolbox which can be used to design, analyze, and visualize antenna elements and arrays.


He also elaborated on the choices to be made while designing antennas to fulfil the specifications and further refining, analyzing, and visualizing the antenna's performance using iterations until the results match the requirements. Additionally, the Antenna Array Designer App was used to indicate the design and analysis of 6- element linear array of half wavelength dipoles.

The session titled Hardware Interfacing with MATLAB was delivered by Mr. Suraj Gawande on day 4. He began the session with briefly explaining MATLAB Coder, Simulink Coder, HDL Coder & Embedded Coders in the two different families of coders, followed by MATLAB language features for C and C++ code generation. Various hardware support packages for hardware types such as audio, FPGA, Imaging, Processors, SoC, Software Defined Radios etc. were then introduced. Code generation & deployment into hardware board, configuring Simulink models for embedded code generation and effectively interpreting the generated code were some key highlights of the session. He demonstrated how to create a custom target for board such as Android, Arduino and Raspberry Pi and deploy the code using the target.

The session titled 5G Wireless communications using MATLAB was delivered by Mr. Uvaraj Natarajan on day 5. He provided a bird's eye view of the evolution of wireless communication (right from 1G to 5G), evolution of wireless standards, the timeline of 5G standardization with the phases of 3GPP releases, 5G requirements, applications, and use cases.

How 5G will handle 'n' times more data was illustrated. Basic concepts of FDD/TDD, OFDMA, MIMO, Frame structure and variable carrier sub-spacing were covered. He further explained the features of 5G physical layer and end to end 5G simulation with 5G toolbox. The waveform generation for 5G was demonstrated. Under 5G measurements and testing, 5G NR downlink ACLR measurement and over-the-air testing with Software Defined Radio (SDR) and RF instruments was covered. The session concluded with the speaker clearing the doubts and queries of the participants through a Question & Answer session.
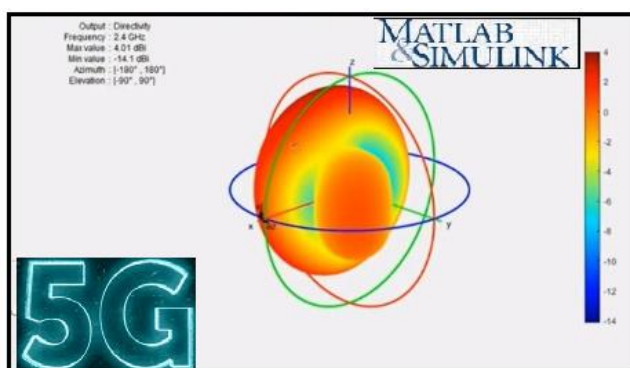
Subsequently, there was a brief valedictory function, wherein a few participants provided their valuable feedback about the workshop.

Dr. Varsha Turkar, Professor and Head of the Electronics and Telecommunication Engineering Department and chair, IEEE Bombay Section-WIE Affinity Group, delivered concluding address and cited the highlights of the STTP.

The entire event was coordinated by Prof. Deron Rodrigues and Prof. Mohini Naik, also received assistance from IEEE Student Branch Counselor, Prof. Yeshudas Muttu and Technical assistance team Mr. Ignatius Dias & Mr. Romeo D'Cruz.

One-Day Programming Competition "TECH-CODERS"

The IEEE Student Branch of Don Bosco College of Engineering organized a One-day online Coding Competition "TECH CODERS" on 13 September 2020 (Sunday) on HackerRank Platform for DBCE Students under the guidance of IEEE Branch Counselor, Prof. Yeshudas Muttu. The main objective of this competition was to enhance the student's logical thinking and problem solving skills considering the current scenario with respect to placements. This also inspired a new level of enthusiasm for extra-curricular activities.

The C++ based Competition was scheduled from 3:00 pm – 6:00 pm & Python based Competition was scheduled from 6:30 pm – 9:30 pm. The Problem statements on C++ and Python coding were grouped into three different modules, i.e. Easy, Moderate & Difficult. Each module was allocated with one hour duration. The rules and score allotment for each block was provided to the contestants via an online mode well before the event.

Rank	Name of the Participant	Class	HackerRank-ID	Final Score
First Place	Mr. Saiesh Naik	TE-ETC	sai40naik	123 Points
Second Place	Mr. Yash Diniz	BE-COMP	yashdiniz	119.50 Points
Third Place	Mr. Amatya Katyayan	TE-COMP	amatya27	91 Points

Python based competition commenced at 6:30pm with the competition format same as that of C++. The competition ended at 9:30pm, with the following rankings:

Rank	Name of the Participant	Class	HackerRank-ID	Final Score
First Place	Ms. Valini D'silva	BE-ETC	valinidsilva	250 Points
Second Place	Mr. Carson Rodrigues	SE-COMP	rodriguescarson	208 Points
Third Place	Mr. Yash Diniz	BE-COMP	yashdiniz	190 Points

This event received an overwhelming response of 61 Signups on the HackerRank Platform. Principal Dr. Neena Panandikar & HOD-ETC Dr. Varsha Turkar appreciated the efforts put in by the IEEE Team. Prof. Yeshudas Muttu congratulated the IEEE Committee Members for working tirelessly, right from formation of Problem statements, debugging the codes, developing test cases & making the HackerRank Platform ready for the competition. The participants showed great zeal & enthusiasm in coding & were awarded e-certificates for the same.

Workshop on "LaTeX: a Professional Report Writing Tool"

IEEE Student Branch of Don Bosco College of Engineering, Goa organized a short term course on LaTeX platform for final year students of ETC Department. The resource person for the course was Prof. Yeshudas Muttu, Vice-chair, IEEE Bombay Section TPAC. The main objective of this course was to make students aware about software involved in LaTeX which will help them to build the final year project reports in most effective way.

The workshop commenced with a brief introduction on LaTeX distribution & text editor, followed by a brief session on initialization of the softwares namely MikTeX and Texmaker, creation of a document and entering the content directly, inline math mode & display math mode was described. Inserting common math notations like superscripts, subscripts, special symbols, trigonometric functions, logarithmic functions and root functions in the document was discussed. Inserting brackets, equations, tables and arrays was explained.

Prof. Yeshudas Muttu described listing in LaTeX and its variants like creating list within a list, use of labels, etc. This was followed by text and document formatting wherein bold, italics, text alignment and change in font style was explained. Creating title, sections, subsections, chapters, displaying table of contents, headers and footers was discussed in detail. This hand's on workshop was conducted on 22nd & 28th October, 5th, 12th, 19th & 26th November, 10th and 17th December 2020 from 2:30 p.m. – 4:30 p.m. Right from installation of MikTeX & Texmaker softwares till creation of final LaTeX document was well planned & executed.

EXPERT TALKS

Talk on Introduction to AI and ML & Introduction to Fuzzy Systems

Dr. Shreyas Simu gave a session on basics of AI & its disciplines on 3rd Nov. 2020. This was followed by details of the Turing test, expert systems, graph search algorithms, strong AI and weak AI, training and testing and ML algorithms. He also gave a session on fuzzy logic using various illustrations, the graphical representations and a video to detail out more terminologies, 6th Nov. 2020.
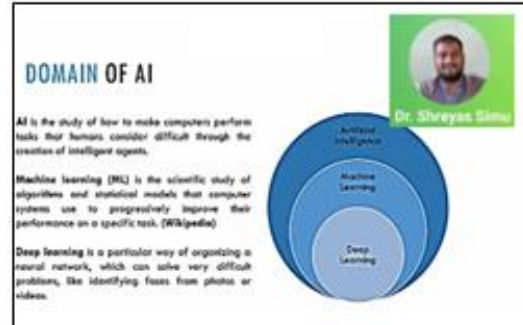
Talk on Artificial Neural systems & Applications of Neural Algorithms and systems
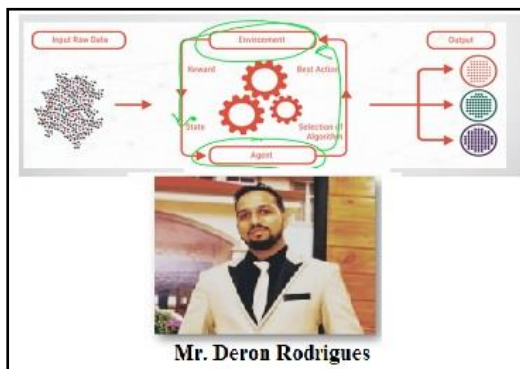

Mr. Deron Rodrigues

Prof. Deron Rodrigues on 4th Nov. 2020 gave a session on Fundamentals of neural networks, models of Artificial Neural Networks, design of AND gate using Perceptron Model, Learning rules in Neural Networks, and selection of suitable activation functions for the neural networks.

He also gave a session on 5th Nov. 2020 focusing on vital issues in neural networks followed by tasks performed by neural networks such as: classification, clustering, Regression, Pattern association etc. Deep learning was then introduced and various difficulties in training deep neural networks were explained.

Talk on Demystifying Machine Learning using Orange

Dr. Sangita Chaudhari started the session by giving an insight about the orange software & its role in Machine learning. This went on through various widgets provided in the orange software thus, detailing out its applications. Various learning models in the software were communicated. Creation of tree structures using Orange was demonstrated which serves in making and checking complex algorithms in Machine learning and Artificial Neural Networks.
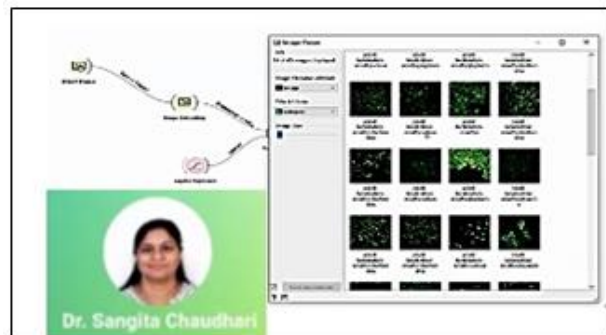
Talk on Introduction to Wavelet Transforms
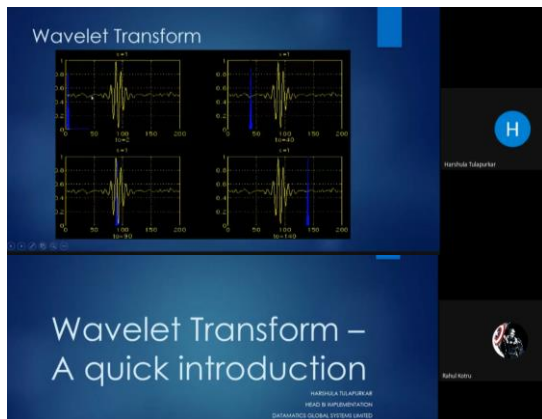
Dr. Varsha Turkar, HOD, Dept. of ETC, has organised an expert talk for Sem VII students of ETC Dept. on 15 October 2020 on "Introduction to Wavelet Transform". The expert invited was Ms. Harshula Tulapurkar.

Ms. Harshula began with what is Discrete Fourier Transform (DFT), advantages and disadvantages of DFT and how the disadvantages of DFT are overcome by Discrete Wavelet Transform. She shed light on the importance of Discrete Wavelet Transform.

Talk on Introduction to Computer Tomography
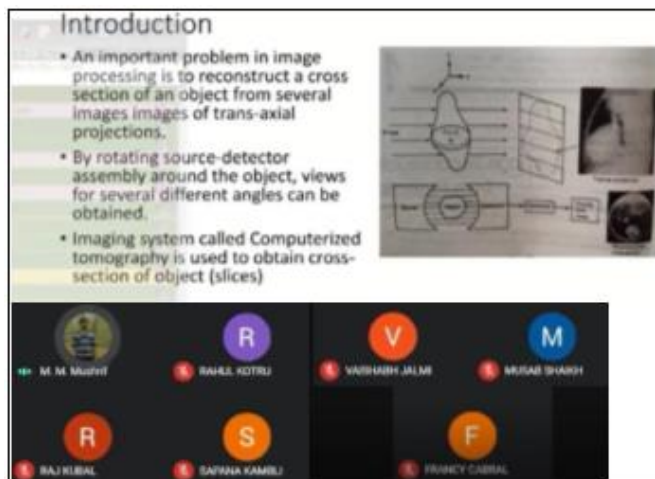
Dr. Varsha Turkar, HOD, Dept. of ETC, organised an expert talk for BE students (Image Processing Batch) on 6 Nov.2020 on "Introduction to Computer Tomography". Dr. Milind Mushrif began with what Computer Tomogrpahy is. He shed light on the importance of Computer Tomography in Medical Imaging. He also explained Radon transform, Back-Projection Operator, and Fourier-slice theorem. Dr. Milind also demonstrated how to use MATLAB to apply Radon Transform.

Talk on Pipelining in Computer Architecture

Under Partial completion of syllabus by Industry experts, the ETC Department conducted its first online class, in the subject Introduction to ARM architecture for the FE ETC Students, on 28th Oct. 2020. The class was on Pipelining in Computer Architecture, by Dr. Jonathan Joshi, C.E.O of Eduvance.
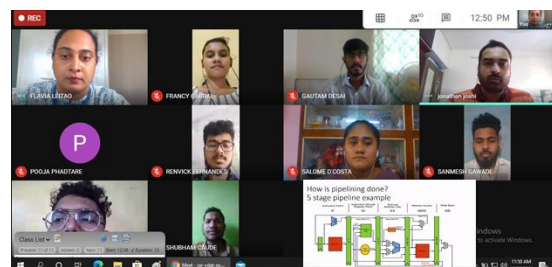
The main objective of this lecture was to make students aware of the concept of Pipelining and how it's used in computer architecture. Prof. Flavia Leitao welcomed everyone for the session and introduced Dr. Joshi to the audience. Initially, Dr. Joshi spoke on the importance of pipelining. Then, he explained the different stages of pipelining in 5-stage pipelining, with the help of ARM instructions. While explaining this he stated the funda, "You carry your own baggage" which should always be remembered while pipelining. On covering all the required details in pipelining he came to the Hazards of pipelining. Dr. Joshi ended the lecture by providing solutions on how hazards in pipelining can be minimized using stalling, forwarding and flushing.

Technical Article - Red Planet calling

It is no secret that billions of years ago, the Martian land had a habitable ecosystem. There is every possibility there could still be microbial life deep underneath the surface of the 'Red Planet'. Mars is the fourth planet from the Sun having the size half more than Earth and has mere 38 percent of Earth's gravity. A day on Mars is just 40 minutes longer than that on Earth, hence for one year on Mars it takes 687 Earth days.

Despite being smaller, the planet's land area is roughly equivalent to the surface area of Earth's continents.

With thin layers of Carbon Dioxide in the atmosphere with periodical appearance of Methane hampers sustainability of life on Mars.

Several studies carried out by researchers in the recent past have revealed the presence of water bodies locked under the icy Polar Caps besides flowing liquids, basins and deltas. Somewhere it also indicates the probability that once there could have been a vast ocean on the planet Mars.

One of the main reasons behind the researchers taking keen interest today in the study of Mars is to understand the process of Climate Change and correlate the findings with that on Earth and also to see if there still exists a possibility of making a living there in future.

Human interest about Mars is not new; in fact, the Red Planet always stood out from the rest and remained at the core of researchers' interest.

Invention of the telescope gave a further boost to study and know about the planet in a scientific manner. It was in the 1960's that humans started showing great interest in Mars exploration.

So far, only Rovers and only unmanned spacecraft have visited Mars. Things may take a big leap with SpaceX planning to send humans on Mars by 2026.

Therefore, it is just a matter of time that we place our feet on the Red Planet to be up close and personal with one of the wonders of our Solar system.

Article complied by:
Mr. Sayed Abul Fazal
SE ETC

FAREWELL of the batch 2020

In the five months since lockdown, restrictions may have eased, but there's no word on the reopening of colleges and schools. For the batch of 2020, wearing the graduation gown seemed a dream. However, to mark the end to a four year long splendid journey of engineering, the ETC department at DBCE tried their best to bid the students of the 2020 batch an online farewell, giving them a chance at offering their crucial years of life, a heartfelt goodbye.

The online farewell ceremony began at 3:00pm, on July 25th 2020. The Director, Rev. Fr. Kinley D'cruz addressed the students, guiding them to face the challenges awaiting them. This was followed by words of wisdom by the Principal, Dr. Neena Panandikar. Head of the Department, Dr. Varsha Turkar then gave her message to the final years which was full of love and enlightenment.

Subsequently, the first issue of ANKUR 2K20, a project idea book launched by the ETC Department along with the final year students was then released. ANKUR 2K20 is a collection of the seeds sown by the final year students in terms of their final year projects, providing a platform to our students to exhibit their novel ideas and will serve as a benchmark for aspiring engineers to gain an insight into the latest developments in engineering and technology.

The class teacher of BE ETC Prof. Deron Rodrigues shared his experience of teaching BE ETC and appreciated their behaviour, responsibility, diligence and unity. Dr. Shreyas Simu, Prof. Mohini Naik, Prof. Natasha Jaques and Prof. Mathilda Colaco also delivered their appreciative messages to the class of ETC 2020 and wished them luck. To refresh some old memories from the first year, a video comprising of the events the students participated in, like the mannequin challenge, dance competition etc., was played.

As a goodbye gift to BE ETC, the juniors had made a video to go down the memory lane. The faculty members expressed their love towards the students by singing some lovely songs in chorus and what a lovely moment that was. Prof. Mathilda Colaco was the compere for the event. The ceremony was concluded with a vote of thanks by Prof. Deron Rodrigues, the event coordinator.

Alumni Interview: Ms. Preeti Jagadev

Ms. Preeti Jagadev is a research scholar at National Institute of Technology (NIT) Goa. She is an alumnus of Don Bosco College of Engineering from the Electronics and Telecommunication department and has earned her Masters in Electronics Communication and Instrumentation Engineering from Goa College of Engineering. Recently, she has been listed among 25 renowned women scientists across the globe in the field of optics by the International Society of Optics and Photonics (SPIE). She is currently working on human health monitoring using infrared thermography and artificial intelligence.

1. How does it feel to be the only Indian to be listed among the world's top women scientists?

Preeti Jagadev: It feels amazing. I'm very happy that I could make Goa and India proud. And also, Don Bosco College of Engineering proud since I'm from the first batch. The responsibility has increased. I hope that after me, more Indians get featured.

2. Coming, from an Engineering background, what was the inspiration behind getting into the healthcare industry?

I always liked biomedical. I had also taken it as an optional subject during engineering and my sister is a doctor. So, I was always interested in it. But later, one of my family friends passed away from cancer. This was the time I took it seriously. I always felt that doctors work in Medical field and Engineers are in technology. But Biomedical Engineers use technology to work in healthcare so they have added advantage. They combine the two to do something.

3. Could you please elaborate on some of your research publications in the optics field?

I'm making use of infrared thermography and artificial intelligence for human health monitoring in a contactless manner. It is a very broad field as it uses infrared thermography, artificial intelligence, signal processing and biomedical engineering. I've done 2 conferences in the USA, Tokyo, India, Brazil. For journals we need peer review wherein the experts around the world review our manuscripts. So, I have submitted journals in infrared physics and tech, biomedical physics and engineering. My first paper got a 2-page review because of which I had to make some changes before submitting it. My work got listed as the Most Downloaded Work with the Maximum Social Impact for the year 2020.

4. Since it is a rare and upcoming specialization, how did you make it possible to achieve so much depth in your research with limited resources?

When I joined PhD, my guide suggested this project of infrared thermography. Initially, I didn't know the subject in depth and was clueless. Later, I started reading manuscripts. I downloaded research papers found online and read about 30-40 papers a month, which were very difficult to understand. Also, for infrared thermography there is a fixed software called Flir. Nobody knew this software in Goa and my project guide had used a completely different software so I had to learn it entirely on my own. Initially its difficult but if you decide something, and achieve something then nobody can stop you. So, I read a lot of research papers, textbooks and watched YouTube videos. Eventually you get used to it.

5. Can you please briefly tell us what you're currently working on?

Using infrared thermography for biomedical applications. The application that I'm working on is human respiration monitoring using infrared thermography and machine learning in a contact less way. In hospitals all devices are contact in nature like electrodes. For adults it's okay but not for prematures as they have fragile skin. So, what we're trying to do is we want

to monitor respiration without contact. which is quite challenging. However, the advantages are that it will not cause skin allergies, contact method has lot of waste which can't be reused so that will also be prevented. We make use of thermal cameras in a contactless and automated manner to monitor human respiration rate without going to the clinic by getting the setup at home. We are still researching it by using AI to monitor human health. We also require lot of data base. It's still ongoing as database is not readily available since no one has done this before

6. What are some of the other research options that engineering students and graduates can take up if they wish to enter the healthcare domain?

In biomedical engineering, all steps remain same. But area differs due to data acquisition. Since I'm working on lungs and respiration, I'm working in the thoracic region. Similarly, if you make use of brain data, you are in neuroscience domain. But the steps like machine learning, signal processing, image processing remain same. So, it depends on which area you want to research.

7. For someone who wants to pursue the line of optics after engineering, how does one go about it?

Optics has many domains and infrared thermography is one of them. In Goa, no college has optical labs. In NIT Goa there are infrared thermography and OFC labs. But advanced labs are not present in Goa. So, if you're interested in particular domain you can search wherever labs are available and you can go there to work in that domain.

8. Since you began your wonderful journey from the first batch of our college, would you like to give some advice or parting words to the current engineering students?

This phase of B.E. is really good so enjoy your college life. But in these 4 years you can learn a lot because all the knowledge that you get now is the basis for your M.E. and PhD. So, take the subjects seriously and try to follow what teachers teach and ask your doubts. Try to be good in technical aspects like coding, do mini projects and internship as it gives a good exposure. For girls, I want to say that you have to achieve whatever dreams you have. Don't think that since you're a girl, there's age limitation; there's nothing like that. In life everything is temporary. Only your identity is permanent. Like Dr. APJ Abdul Kalam who we remember even today for what he has done for the nation. No one can take his achievements away from him. So, work towards building your identity. And you should not quit. You will face lot of challenges but you don't give up.
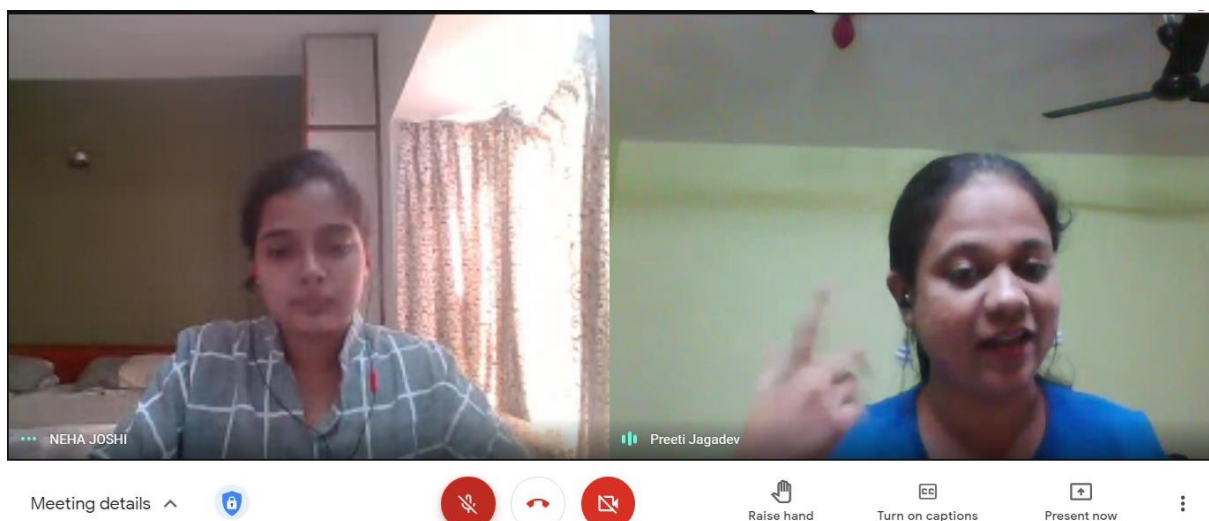
IEEE Day Celebration 2020

For the first time since its inception, the IEEE Student Branch of Don Bosco College of Engineering, Fatorda-Goa observed IEEE Day with the tagline, Celebrate the bond of Technology. It was celebrated on 02 October 2020 from 10.00 am to 1.00 pm. Keeping in mind the norms of the pandemic, the event was held on an Online Platform & was coordinated by IEEE Student Branch Counselor, Prof. Yeshudas Muttu. The chief guest was Dr. Saurabh Mehta, Chair of IEEE Bombay Section Technical & Professional Activities Committee and was attended by Dr. Varsha Turkar, HOD-ETC, and all IEEE student members. The dress code was mandated to be blue. The entire event was hosted by Ms. Neha Joshi, Secretary of the IEEE Student Branch.
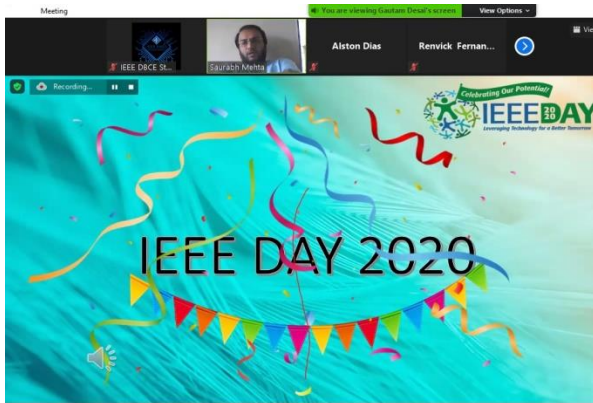
Mr. Alston Dias, IEEE Student Branch Webmaster introduced the chief guest to everyone. Dr. Saurabh Mehta spoke about the importance of celebrating IEEE Day. Moreover, he also informed the attendees of the various benefits and perks an IEEE member can avail. He encouraged the student members to take upon the facilities that the organisation provides and to use it at full advantage as it would help in building professional careers.

The second half included fun events for the student members, with its objective to strengthen communication and networking between fellow members by participating in the games that followed. It was commenced by Ms. Anjima Rajesh, IEEE student member who hosted Shazam wherein participants had to guess the name of the song that was played for them.

Following this, Memeflix-a quiz- was conducted by Mr. Suyog Borker, IEEE Treasurer and Mr. Kingsley, IEEE student member. The participants' knowledge was tested in three rounds-Netflix, Memes and IEEE. Subsequently, Ms. Krystal Fernandes, IEEE Joint Secretary and Ms. Valini D'Silva, IEEE student member hosted Scribble It! wherein participants had to draw a word and the others had to guess what it was.

Surf It, Say It event was planned by Mr. Renvick Fernandes, IEEE Chair and Mr. Gautam Desai, IEEE Vice-Chair. Wherein, a topic was given to the attendees and two minutes of search time was given, then after they had to return and talk about it. The aim to conduct this was to expand the knowledge of the members about the IEEE organisation. The celebration culminated with smiles on everyone's faces for commemorating IEEE which has provided each one with wonderful memories, experiences and skills that no other organisation would deliver.

STUDENT'S ACHIEVEMENTS & FELICITATION

- Mr. Britney Viendra Mascarenhas, Mr. Nigel Ignatius Dsouza and Mr. Jemimah Gonsalves from SE ETC successfully completed NPTEL course in "Introduction to R Software".
- Ms. Jaitali Arun Kunkalkar and Ms. Saili Ramchandra Naik from TE ETC successfully completed NPTEL course in "Introduction to Embedded System Design".
- Project "Fire Fighting Robots Using Swarm Intelligence", was shortlisted for Semi-final & Final round of the GCCI Project Competition 2020
- Project "Aquatic Waste Collecting System", was shortlisted for Semi-final & Final round of the GCCI Project Competition 2020
- Project "Automatic Shopping Mart using Firebird Robot", was shortlisted for Semi-final & Final round of the HACKSAGON 2020, National level Project competition
- Project "Automated Plant Monitoring Robot", was shortlisted for Semi-final & Final round of the HACKSAGON 2020, National level Project competition
- Project "Automated Plant Monitoring Robot", won second place organized by ETC Department, Late G.N. Sapkal College of Engineering, Nashik

INTERNSHIP/ TRAINING & PLACEMENT

Due to the on-going pandemic situation and students are unable to go to the company in person. All the students attended and completed a minimum of 30 hrs certified course. The topics included Python basics, Introduction to programming with MATLAB , Basics of web development and coding, Android app development, Internet of things, Basics of computer networking, Google IT automation with python, IBM cyber security analyst, Java programming and software engineering Fundamentals, Hardware description languages for FPGA design, Introduction to openCL on FPGAs, Machine learning, Deep learning, Programming the Internet of things, Innovation and entrepreneurship and Digital marketing.

These courses were conducted by reputed universities and companies across the globe which included university of Colorado, Yonsei university, University of California, Duke university, Google, Intel, IBM to name a few.

FACULTY INITIATIVES

- Dr. Varsha Turkar was appointed as an executive member and the Chair for IEEE Women in Engineering Bombay Section Affinity Group. The Bombay Section covers Maharashtra, Goa, Madhya Pradesh, Chhattisgarh and Diu-Daman UT (from Aug 2020 till date 13 workshops/webinars are organized)
- Dr. Varsha Turkar got extension till March 2021 for ISRO Sponsored project

- Prof. Mohini Naik, was called on by the honourable, Chief Minister of Goa Dr. Pramod Sawant at the CM's Residential Office on 11th November 2020. Chief Minister appreciated the work done by, Prof. Mohini Naik and encouraged her to work further on the ATL projects in the state
- Prof. Mohini Naik was appointed as the course co-ordinator for IIRS ISRO e-learning courses by IIRS from July 2020 onwards.

- Prof. DS Vidhya was appreciated for her efforts in disseminating and supporting the learners of the Swayam NPTEL Local Chapter Don Bosco College of Engineering, as a Single Point of Contact (SPOC) during the Jan-Apr 2020 semester.

- Prof. Yeshudas Muttu was ppointed as Vice Chair, IEEE Bombay Section Technical & Professional Activities Committee (TPAC) on 1st August 2020
- Prof. Yeshudas Muttu was appointed as state head of Goa for Higher Education under SIETIIE, an innovation and research organization on 12th November 2020
- Prof. Deron Rodrigues was invited as Resource person for the IEEE Student Branch WIE AG Organizes five days Online SKEP on "Introduction to AI & its Applications" from November 3-7, 2020
- Prof. Deron Rodrigues was invited as Judge for judging Poster Competition 'Posterify' at Techyon 2020 at Padre Conceicao College of

Engineering, Verna

- Dr. Shreyas Simu was invited as Resource person for the IEEE Student Branch WIE AG Organizes five days Online SKEP on "Introduction to AI & its Applications" from November 3-7, 2020
- Dr. Shreyas Simu was appointed the Member Secretary of the Institution–Industry Cell of DBCE on 22nd Oct. 2020
- Dr. Varsha Turkar was appointed as a WIE Chair for the prestigious first International India Geoscience Remote sensing Symposium (InGARSS2020) 2 to 4 December 2020 (General Chairs: Dr. Paul Rosen, NASA/JPL, USA, Dr. Shiv Mohan, Ex SAC/ISRO)
- Dr. Varsha Turkar was the Resource Person for a webinar on "Applications of Satellite Image Processing" organised by Usha Mittal Institute of Technology, SNDT Women's University, Mumbai and IEEE GRSS Mumbai Chapter on May 8, 2020
- Dr. Varsha Turkar was the Resource Person for a webinar on "IEEE WIE Membership Benefits and Scope", SMELT 2020, organized by IEEE Bombay SAC on 29 September 2020
- Dr. Varsha Turkar was invited as a jury member for reviewing the M.Tech Geomatics seven thesis on 21st May 2020 by CEPT University, Ahmedabad
- Dr. Varsha Turkar was appointed as a member of Board of Studies in Faculty of Information Technology under H(S)NC University as an Academic Advisor for M.Sc. (IT) course at K.C College October 2020
- Dr. Varsha Turkar was appointed the Chair of the Research and Development (R&D) cell of DBCE on 1st August 2020
- Prof. Mohini Naik was appointed Session Manager/Session Chair for the 2020 IEEE International Geoscience and Remote Sensing Symposium September 26 - October 2, 2020
- Prof. Mohini Naik was appointed as the IEEE Bombay section-Women in Engineering Committee Member on 1st August 2020
- Prof. Mohini Naik was invited as Resource person for the One week online ISTE Approved FDP on "Recent Advances in RF and Microelectronics" from 31st August 2020 to 4th September 2020
- Prof. Mohini Naik was invited as Resource Person for the 1 day awareness cum orientation program on setting up of ATAL TINKRING LAB for the head of schools in Goa organized by the State council of education research and training on 15th Dec. 2020
- Prof. Mohini Naik served as active member of Elsevier Advisory Panel 2020
- Prof. Yeshudas Muttu was appointed as the IEEE Bombay section-Women in Engineering Committee Member on 1st October 2020
- Prof. Flavia Leitao was appointed the Member Secretary of the Research and Development (R&D) cell of DBCE on 1st August 2020
- Prof. Flavia Leitao was appointed the Member of the Institution–Industry Cell of DBCE on 22nd Oct. 2020
- Prof. Samantha Cardoso was appointed the Member of the Institution–Industry Cell of DBCE on 22nd Oct. 2020

CONSULTANCY

Company: **Carbon-e**
Period: July 2020
Work done: Prof. Flavia Leitao trained the team in designing the PCB in Eagle, generating the Gerbers and G-codes and fabricating it on the Nvis 72 and also assisted them with their first and second prototype manufacturing

Company: **Asier Solutions (OPC)**
Period: Sept. 2020
Work done: Prof. Flavia Leitao trained the team in designing the PCB in Eagle, generating the Gerbers and G-codes and fabricating it on the Nvis 72 and also did their prototype PCB.

PAPER/ JOURNAL PUBLICATIONS

- Dr. Varsha Turkar presented a technical paper titled, "The Effect of Hybrid Polarimetric Descriptors on Classification Accuracy of Various Land Cover Types", IGARSS 2020 - 2020 IEEE International Geoscience and Remote Sensing Symposium (Virtual), 26 September to 2 October 2020
- Prof. Deron Rodrigues presented a technical paper titled, "Design of Sensor nodes for agricultural field monitoring using IOT and BLE mesh technology", for the 7th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON 2020), MNNIT Allahabad (27th-29th November 2020)
- Prof. Flavia Leitao presented a technical paper titled, "Design of Sensor nodes for agricultural field monitoring using IOT and BLE mesh technology", for the 7th IEEE Uttar Pradesh Section International Conference on Electrical, Electronics and Computer Engineering (UPCON 2020), MNNIT Allahabad (27th-29th November 2020)
- Prof. Yeshudas Muttu, Paper titled "Cayenne based Plant Monitoring Control System", got selected for second edition of the "IEEE Bombay Section Signature Conference – IBSSC 2020" to be held during 4th-6th December 2020
- Prof. Mathilda Colaco, Paper titled "Cayenne based Plant Monitoring Control System", got selected for second edition of the "IEEE Bombay Section Signature Conference – IBSSC 2020" to be held during 4th-6th December 2020
- Dr. Varsha Turkar presented a technical paper titled, "Impact of DFT Based Speckle Reduction Filter on Classification Accuracy of Synthetic Aperture Radar Images", INGARSS 2020, 2 to 5 December 2020
- Dr. Varsha Turkar presented a technical paper titled, "A Novel Method To Remove Speckle From PolSAR Images Using Morphological Operations", INGARSS 2020, 2 to 5 December 2020

- Dr. Varsha Turkar, paper titled, "Air Pollution Prediction Using Machine Learning", is accepted at 2020 IEEE Bombay Section Signature Conference (IBSSC), 4 to 6 December 2020
- Dr. Shreyas Simu, paper titled, "Air Pollution Prediction Using Machine Learning", is accepted at 2020 IEEE Bombay Section Signature Conference (IBSSC), 4 to 6 December 2020
- Prof. Kimberly Moraes, paper titled, "Teaching Power Electronics with the Aid of Open Source Simulation Tool eSim", is accepted at 2020 IEEE Bombay Section Signature Conference (IBSSC), 4 to 6 December 2020

WORKSHOPS/SEMINARS/EXPERT TALKS CONDUCTED

- Prof. Michelle Araujo and Prof. Vidhya D.S conducted an "NPTEL Awareness Program", on 15th July 2020
- Prof. Yeshudas Muttu conducted a hands-on FDP on "Google Classroom", on 16th July 2020
- Prof. Flavia Leitao conducted a hands-on FDP on "PCB Design and fabrication", on 19th August 2020
- Prof. Deron Rodrigues and Prof. Mohini Naik organised a STTP on "5G Wireless Communications & Antenna Design using MATLAB & Simulink", on 11th, 12th, 17th, 18th and 25th August 2020
- Prof. Trima P. Fernandes e Fizardo and Prof. Samantha Cardoso organised a one week online ISTE on "Recent Trends in RF and Microelectronics", from 31st August to 4th September 2020.
- ETC Faculty members conducted an Orientation Program for SE ETC on 12th September 2020, to introduce the students to the various technical and non-technical activities carried out by the department.
- Prof. Yeshudas Muttu coordinated a Programming Competition "TECH-CODERS", for IEEE students, on 13 September 2020
- Dr. Varsha Turkar organized an Expert Talk on "Wavelet Transform", on 15th Oct. 2020, for BE students (Image Processing Batch)
- Prof. Flavia Leitao organized an Expert Talk on "Pipelining in Computer Architecture", on 28th Oct. 2020, for BE students (ITA Batch)
- Dr. Varsha Turkar, Dr. Shreyas Simu, Prof. Deron Rodrigues, Prof. Yeshudas Muttu, Prof. Mohini Naik, organized five days Online SKEP on "Introduction to AI & its Applications", from 3rd Nov. to 7th Nov. 2020
- Dr. Varsha Turkar organized an Expert Talk on "Introduction to Computer Tomography", on 6th Nov. 2020, for BE students (Image Processing Batch)
- Prof. Yeshudas Muttu conducted a Session on "Effective Face Detection, Feature extraction & Neural Network-based approaches for facial expression recognition", on 24th November 2020, under R&D Knowledge Sharing initiative
- Prof. Mohini Naik conducted a Session on "Millimeter wave applications", on 24th November 2020, under R&D Knowledge Sharing initiative

- Prof. Kimberly Moraes conducted a Session on "Understanding your Electricity Bill", on 15th December 2020, under R&D Knowledge Sharing initiative
- Prof. Priyanka Padiyar conducted a Session on "A Comparative Study of Wavelet based ANN and classical techniques for Geophysical Time Series Forecasting", on 15th December 2020, under R&D Knowledge Sharing initiative
- Prof. Yeshudas Muttu conducted a Workshop on "LaTeX: a Professional Report Writing Tool", on 22nd & 28th October, 5th, 12th, 19th & 26th November, 10th and 17th December 2020 from 2:30 p.m. to 4:30 p.m, for the BE ETC students

WORKSHOPS/SEMINARS/EXPERT TALKS ATTENDED

- ETC Faculty members attended a hands-on FDP on "Google Classroom", on 16th July 2020
- ETC Faculty members attended a hands-on FDP on "PCB Design and fabrication", on 19th August 2020
- ETC Faculty members attended a STTP on "5G Wireless Communications & Antenna Design using MATLAB & Simulink", on 11th, 12th, 17th, 18th and 25th August 2020
- Prof. Michelle Araujo and Prof. Trima P. Fernandes attended AICTE Training And Learning (ATAL) Academy Online FDP on "Internet of Things (IoT)", from Ramrao Adik Institute of Technology, from 24th to 28th Aug. 2020
- ETC Faculty members attended one week online ISTE on "Recent Trends in RF and Microelectronics", from 31st August to 4th September 2020.
- Prof. Trima P. Fernandes attended a 5 day workshop on "NIPLW Kapila-Kalam Program for IP Literacy", organised by MHRD Innovation Cell
- Prof. D.S. Vidhya attended a 1 week workshop on Introduction to Artificial intelligence and its application, from 3rd to 7th Nov 2020
- Prof. Michelle Araujo attended a 4 day FDP on "Innovation, Creativity & Startups", organized by Goa State Innovation Council (GSInC)
- ETC Faculty members attended a session on "Effective Face Detection, Feature extraction & Neural Network-based approaches for facial expression recognition", on 24th November 2020, under R&D Knowledge Sharing initiative
- ETC Faculty members attended a session on "Millimeter wave applications", on 24th November 2020, under R&D Knowledge Sharing initiative
- ETC Faculty members attended a session on "Understanding your Electricity Bill", on 15th December 2020, under R&D Knowledge Sharing initiative
- ETC Faculty members attended a session on "A Comparative Study of Wavelet based ANN and classical techniques for Geophysical Time Series Forecasting", on 15th December 2020, under R&D Knowledge Sharing initiative
- Prof. Anisha Cotta attended an AICTE sponsored One week STTP on "Research Methodology and Computational Techniques- Phase 1", from 7th to 12th December 2020
- Prof. Kimberly Moraes did a 3 weeks Coursera course on "Introduction to Power Electronics", from the University Of Colorado Boulder

One day awareness program on Atal Tinkering lab for schools across Goa

One day orientation program on setting up of Atal Tinkering Lab was organized by State Council of Educational Research and Training, Department of Education, Government of Goa on Tuesday, 15th December 2020 as per detailed given below. Prof. Mohini Naik, invited as resource person for the said program.

Mr. Nagaraj Honnekeri , Director- SCERT Goa State Council of Educational Research and Training (SCERT) , gave brief introduction about the state programs for the schools and its benefits. He also mentioned the achievements of Prof. Mohini Naik who is the regional mentor for the state under ATL project. Prof. Mohini Naik, than continued with the session by explaining details of ATL and its benefits to the school.

This session was attended by nearly 350 schools across Goa. Entire program was divided into three batches as per the location of the schools. All the head of the schools have attended this orientation program.

UPCOMING EVENTS

- ➢ ETC Alumni Meet in Feb. 2020
- ➢ "PCB Design and Fabrication" workshop for faculty members in Feb. 2021
- ➢ "Workshop on HAM Radio" for Student's Satellite club in March 2021
- ➢ "Recent trends in development of Smart Antenna" for Antenna Research group in April 2021
- ➢ "e-Yantra Robotics" Workshop for faculty members in March 2021
- ➢ "Analog IC Design" workshop under IETE for ETC students in Feb. 2021
- ➢ "Full Stack developer" workshop under IETE for ETC students in March 2021
- ➢ "Analog Electronics" workshop using eSIM for ETC students in March 2021
- ➢ "Python Programming" workshop for TE ETC students in April 2021