



itc

**Institute
Technical
Council**

Learning Never Stops

End Term Work Report

2021 - 22

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Core Team

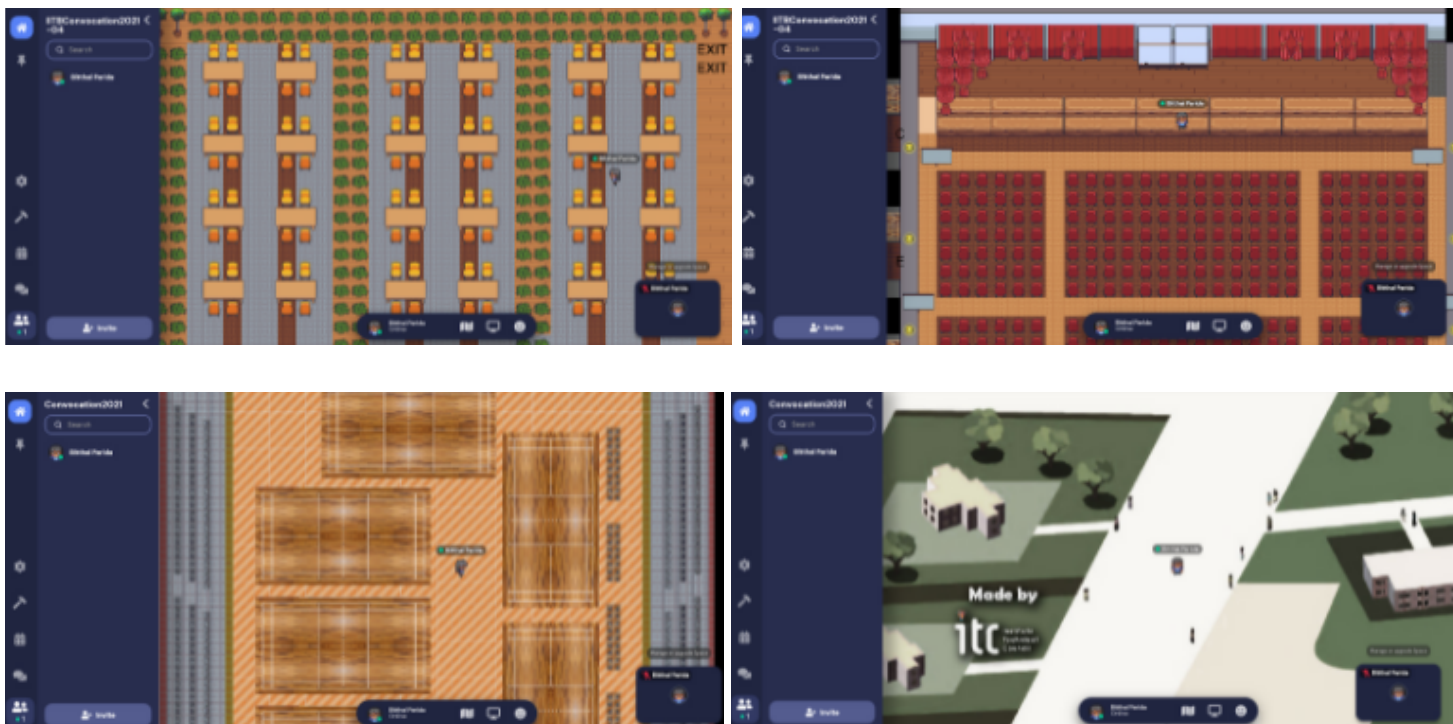
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PAN ITC Events



GatherTown

This year the 59th Convocation of IIT Bombay will be held on Saturday, August 07, 2021. To cater to the convocation ceremony as a tribute to seniors, we took up the initiative of the e-convocation on gathertown. This initiative was under the guidance of Prof. Parag Chaudhuri and Prof. P Sunthar from the CSE department. Gathertown is a platform for virtual gathering and we have created a virtual model of our institute on the same. All graduating students and even juniors were allowed to access the platform and interact with each other. This initiative gave seniors to virtually move around the institute with friends and juniors and helped replenish their campus memories. This year we adapted the map which was developed last year and came up with new additions to the same. For instance we added indoor sports facilities like the gymkhana building, badminton courts and cricket nets, we also added a map for the convocation hall and gulmohar. Co-ordinating with every hostel council, institute bodies, sports clubs and cultural clubs we updated all the pre-existing materials on the map and replaced them with content that was given to us to cater to the recent graduating batch. We also added an unique game of dungeon which kept the users enthralled throughout as well.



During the weekend of 9th-11th July 2021, we held the IndustryX weekend, a series of virtual talks and Q&A sessions conducted by the industry leaders and leading researchers in rapidly developing fields. Over these three days, various speakers shed light on fields ranging from Swarm Robotics to Cryptocurrencies and Blockchain.

We received an enthusiastic cumulative participation of 370+ students.

The following were the speakers we had the honor of interacting with for the event

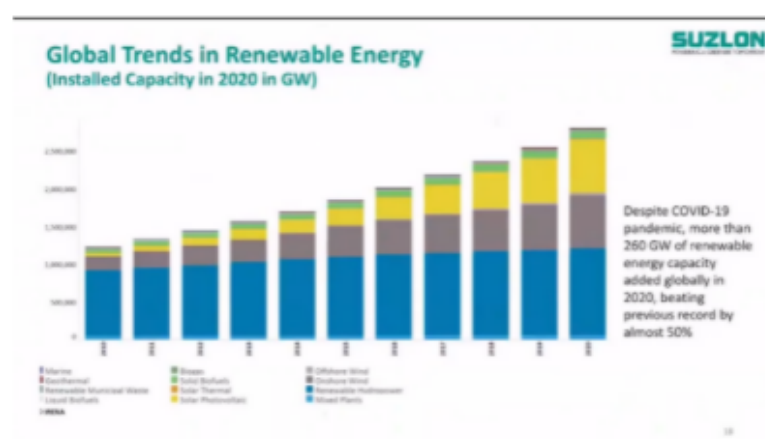
Swarm Robotics (9th July 2021)

Speaker: **Dr. Sabine Hauert**, Associate Professor of Swarm Engineering at the University of Bristol & President and Co-founder of Robohub.



Space Technology (9th July 2021)

Speaker: **Mr. Tushar Jadhav**, CEO of Manastu Space, IITB Alumnus with experience of many years working in the Indian Defence and Aerospace Sector.



Cryptocurrency & Blockchain (10th July 2021)

Speaker: **Mr. Jaynti Kanani**, Co-founder & CEO of Polygon(formerly known as Matic)

Future of Renewable Energy (10th July 2021)

Speaker: **Mr. Tuls R. Tanti**, Founder, Chairman, and Managing Director of Suzlon Group, a pioneer in the Indian renewable industry, and one of the first clean energy entrepreneurs of India.

FinTech & Ecommerce (10th July 2021)

Speaker: **Mr. Bhaskar Krishnan**, Senior Director and Head of Product at Rakuten, having experience of more than two decades in the fields of FinTech and Data Science.



Deeper look into software engineering industry (11th July 2021)

Speaker: **Mr. Sanjay Malpani**, Vice President, Engineering at GitHub, an alumnus of IIT Bombay. Previously director of engineering for Azure Developer Services at Microsoft.



Quantum Computing (11th July 2021)

Speaker: **Dr. Abhinav Kandala**, Research Staff Member at IBM T.J. Watson Research Center, an alumnus of IIT Bombay. An awardee of MIT Technology Review Innovators under 35.

Databasing

The idea of databasing is to have an institute-wide database of students and their technical skills/interests. This database could be accessed by anyone who has provided their information through a LDAP accessible-portal. This was divided into two phases, the first phase collected data specifically for Inter-IIT this year, and the second phase would be open for all and also have advanced features such as search. The first phase is completed (<https://itc.gymkhana.iitb.ac.in/inter-iit/>), and a database of 300+ individuals has been made.

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Inter-IIT

Add Skills | Upload Resume | Refer 2 Friends

Skills: Briefly mention which technical fields you are familiar with and your level of familiarity: 1 - Basic Familiarity, 2 - Intermediate, 3 - Proficient, 4 - Expert
Eg. Profilo Management - 1 (Have basic knowledge and have participated in IITC competitions)
Artificial Intelligence - 3 (Completed IITC course on neural networks, interned at ABC/Control - 2 (Have worked on IITC Prof's project on System)
Case Study - 5 (Have won case competitions)
Finance - 2 (Member of IITC Finance Club)
Guitar/Voice with Documentation - 4 (1 year of IITC)
PS: The word count for operations. Be as specific as possible.

Skill	Rating	Courses	Remove
Robotics	★★★★	Robotics Automation	Remove
Electric Vehicles	★★★☆☆	Working project under a professor	Remove
Blockchain	★★★☆☆	Interested to learn this, beginner	Remove

ADD MORE

SAVE & CONTINUE

Budget

For the year 2021-22, Institute Technical Council was allotted the funds of Rs. 14.25 lakhs. Rs 4.94 lakhs out of these Rs 14.25 lakhs were of carry forward (CF) expenses. We settled all these leftover bills from the previous tenures which couldn't be submitted because of COVID and online tenure. The total budget consumed for various ITC activities and club inventories this year was around Rs. 13.5 lakhs. The extra Rs. 1.5 lakhs budget was approved for the 10th Inter IIT Tech Meet. The settlement of this budget will take place in the next financial year.

Institute Technical Summer Projects

Institute Technical Summer Projects aka ITSP is an annual program organized by ITC for freshmen. The aim is to provide first-hand technical exposure over the period of summer vacations. It also serves as a platform where one explores a field not aligned with their own major. Students are encouraged to also target some real-life problems that can be solved using technology. Selected projects are provided with mentorship by senior undergraduates who have worked on similar projects.

Owing to the pandemic situation this year, ITSP was conducted in an online mode to ensure that students don't miss out. ITSP began around March-end, with the formation of a Discord server to conduct brainstorming sessions to expose students to various opportunities available for project ideas. Students had to submit an abstract detailing the project, learning expected and motivation for doing the project. Projects with feasible problem statements were selected on the basis of abstracts and work done until then. Taking into consideration the pandemic situation, teams were encouraged to use more simulation-based software as substitutes to the hardware requirements and given an option to change over to purely software-based projects. Two rounds of reviews with 4 panels were conducted which was followed by a final presentation session. We also timely shared mentors and mentee feedback forms and tried to help teams with mentors with new expertise if their project demanded the same midway.

Review 1: 24th – 30th May

Review 2: 29th June– 1st July

Final Presentation: 21st – 23rd July

All the teams were asked to submit the following –

- Complete documentation including resources used and subsequent citations
- A small video detailing their project
- 2 - pager documentation (summarizing the project)
- Presentation (~ 10 slides) for the final meet

This year, we also saw a record high in the number of projects completed (40 projects). The closing ceremony was conducted with Shivam Tiwari (co-founder and CEO of Apli.ai) being invited as the keynote speaker. For further development, students were also encouraged to sign up for Technovation, an ITC event aimed at transmogrifying projects into start-ups.

The Prize distribution ceremony link: <https://youtu.be/RYS7puEeh84>

Certificates were provided to all completed project teams and their mentors and certificates of excellence were awarded to the Top 6 teams and mentors in ITSP via a certificate portal. Prizes worth 30000 were decided for the top 6 teams in the form of 'Tech Voucher'.

Inter IIT Tech Meet 10.0

Inter IIT Technical Meet is an exciting annual technical event where students across all the IITs come together for spectacular technical competitions and expositions, entrepreneurial undertakings, and activities with social impact.

The theme for this edition is - "To Newer Horizons: In the wake of the pandemic".

The format similar to previous editions consists of problem statements and showcases. The problem statements are further categorized into high-prep, mid-prep and low-prep.

Inter IIT Diaries 1.0

Tech Meet involves students working on real-life problems and pertaining to local issues and areas that require attention but are not extensively addressed through different platforms. Also, it has elements of knowledge sharing and promoting collaboration among IITs. Thus, to acquaint the students with the experience, thrill, and hard work of the team. Inter IIT Diaries 1.0 was conducted on the 11th of December'21 at 4:00 PM IST. The speakers of the session were Shubham Agarwal and Nakul Randad.



The IIT Bombay contingent lovingly called Bombay 76 was led by selected Contingent Leaders Anirudh Mittal and Aman Malekar along with the Contingent Manager Mridul Agarwal.

The 10th Inter IIT Tech Meet was organized by IIT Kharagpur virtually from the 25th of March to the 27th of March 2022. The four high prep, four mid prep and four low prep problem statements were released in February and March. (<https://interiit-tech.org/events>) IIT Bombay participated in all these events with a contingent of around 80 members. For the selection of contingent members, the databasing portal was modified and interviews were conducted. The results of the Tech Meet are still under discussion, but you can watch the final presentations on this link-<https://www.youtube.com/playlist?list=PLzRcwm99Q4eyK1znFozk84oajBbeBB5An>

UG ORIENTATION



The Freshie Orientation had 2 parts this time, first on 9th December for the ITC Clubs and the second part on 11th December for the ITC Technical Teams. To make sure that the freshies stay interested and engaged in the orientation, we decided to go ahead with the Sherlock theme. Someone murders the GSTA and the orientation goes around Sherlock taking help from various clubs of the ITC to get to the murderer. We live-streamed the first half of the

orientation on ITC's YT channel and gauged a viewership of approximately 3.5K. The second half of the orientation comprised of the live demo of 3 projects of ITSP. here, students were asked to join the MST channel and interact with the presenters of the projects.

The second part of the orientation was on 11th December, here every tech team gave a short overview of themselves in the YT live and in the second half, students we allowed to interact with the members of all the tech team in their respective channels to discuss and know more about the teams.

PG ORIENTATION

A tech orientation for PG students was conducted on the 8th of August, 2021 at the start of the semester. We live-streamed the orientation on ITC's YT channel and gauged a viewership of approximately 700+. About 24 Tech bodies introduced themselves, students were allowed to interact with the members of all the tech teams and clubs in the YT live chat. The streaming was interactive with quizzes and polls in between in the YT chats The session began with overview of ITC and short introduction by GSTA, PG Nominee and Project and Tech Team



Nominee. Over the 1.5 hours event, participants were provided the social media links of tech bodies to connect, ask doubt and to stay updated. The event successfully welcomed students to the Tech side of IITB and gave a glimpse of the host of opportunities in store from ITC.

During this tenure, we have two categories of contests

-Traditional General Championship (GC)

-Industry Technical Challenge (ITC)

For TechCUP

We Restructured this year's Traditional General Championship (GC) with a combination of both Traditional General Championship (GC) and Industry Technical Challenge (ITC) to solve participation problems and to give participants industry exposure and more border views. Industry Technical Challenge (ITC) is designed in such a way that a maximum of 4 members are allowed in a team. The minimum number of members is one. There can be multiple teams from each hostel, Students can participate irrespective of their allotted hostel, Teams comprising of students from across different hostels are also permitted, their grading would be performed adequately and appropriately, Submissions will be judged objectively by the Industry that provides the problem statement (would depend on the company)

We conducted Four ITCs and Four GCs this year.

During the autumn semester, the following competitions were held-

Aero-ITC By Drona Aviation

Energy-ITC by Bosch

The SynScyther GC - By BioX Club

SciComp Blitz GC - MnP Club

During the spring semester, the following competitions were held-

Coding GC- by WnCC

Analytics-ITC by Analytics Club (UGAC)

ASTRO ITC by Kritika

Jhatka GC- By ERC

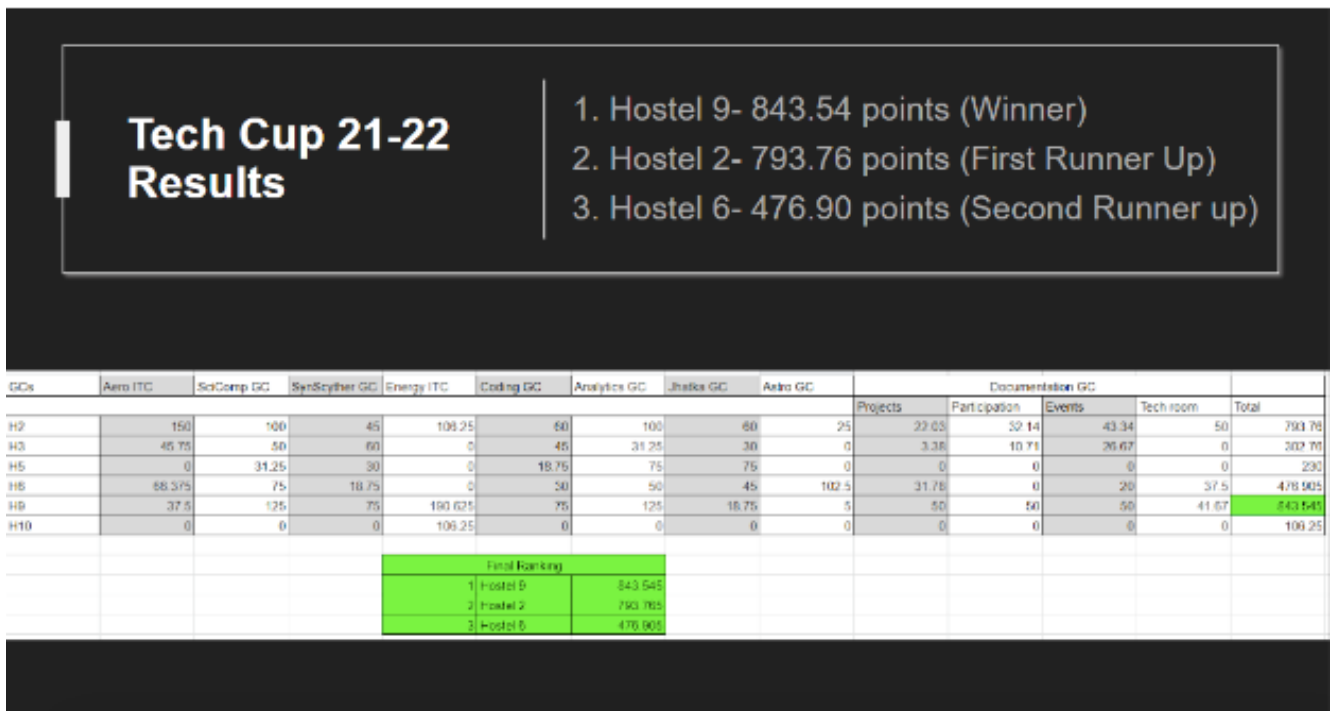
The technical committee meetings were held at the regular intervals (usually once before every GC) to announce the Problem Statements and take feedback from the hostel councils.

Apart from this, there was one submission for the Documentation GC.

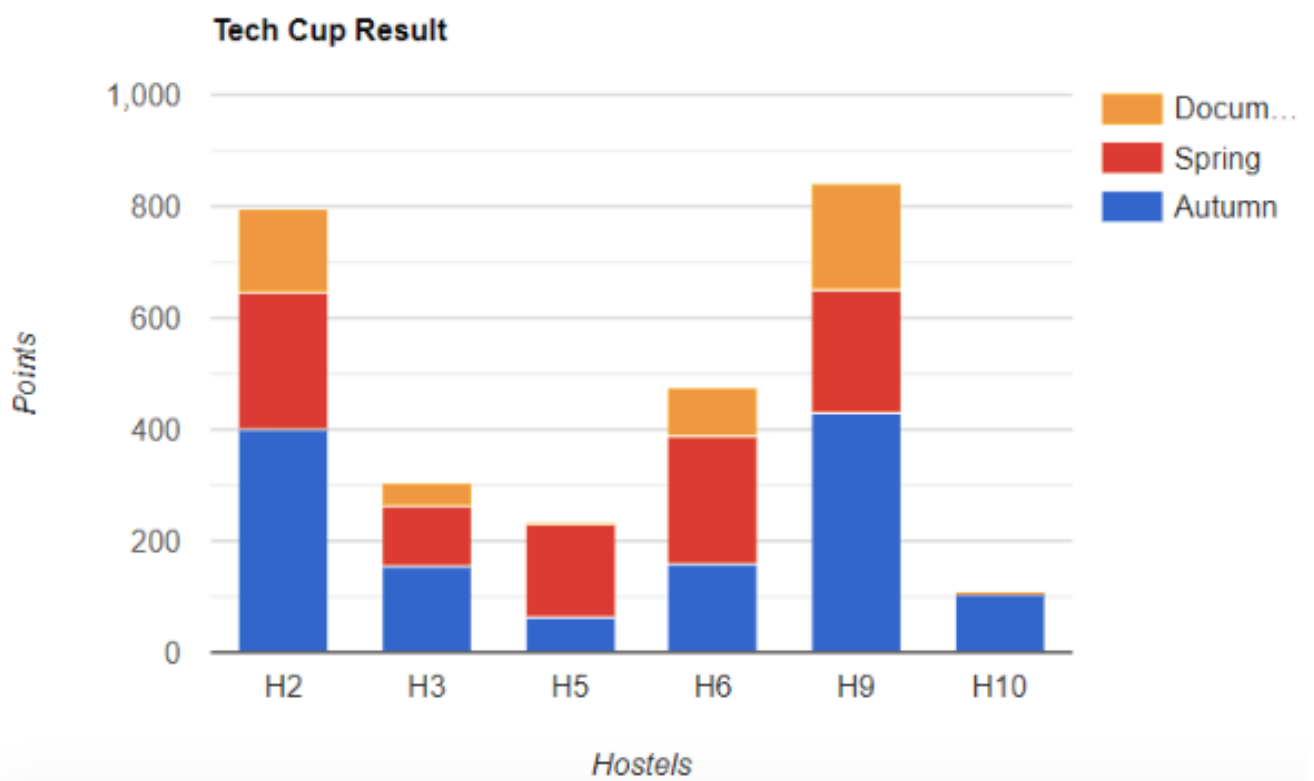
50 points each were given for the 4 sections-

1. Tech Room
2. Technical Activities Participation
3. Projects
4. Events

The final results-



The prize distribution ceremony is scheduled for post end semester examinations.



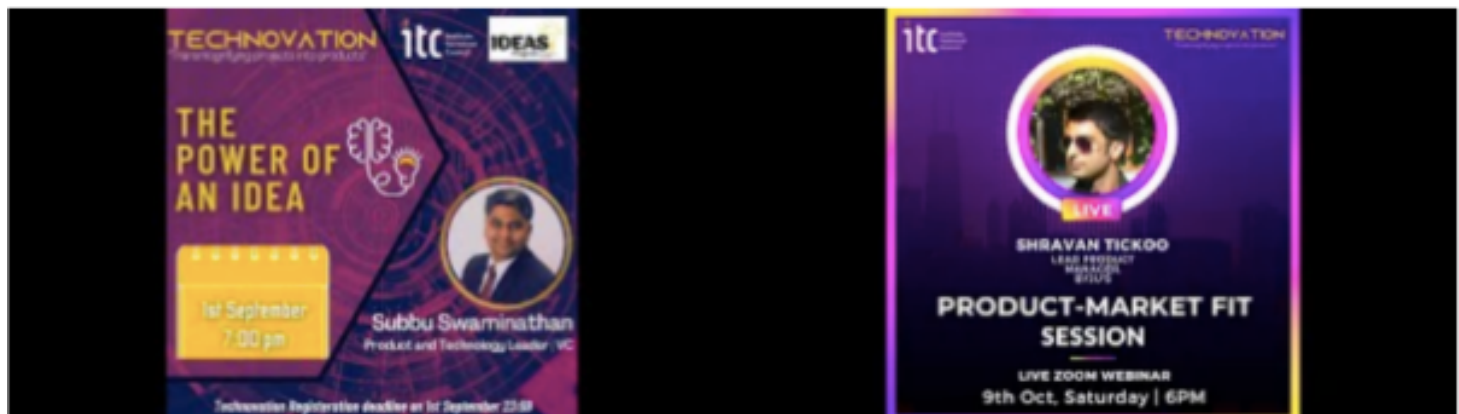
Technovation is intended to serve the following motives:

Allowing students to explore, innovate, and grow.

We believe that the student community of IITB has the potential to be innovators; we're here to give them the technical backbone to develop a technical project product.

Technovation is a support system to fill the gap within the IITB ecosystem. We plan to work with all other elements of this ecosystem to make it whole.

A body for students to explore provides technical mentorship and equipment to create MVP and take it to the next level.



That, in a nutshell, was the idea of the initiative. The execution involved systematic brainstorming sessions, guest lectures (some notable speakers include: Mr Shraavan Tickoo, Mr Subbu Swaminathan), and allotted experienced mentors to each of the teams and guiding them with technical, managerial and financial aspects to help them shape their ideas.

This event saw a participation of 150+ and has the final goal of funding the teams to build their prototype and gearing them up for a pitch to investors.

The teams must work on their idea and submit periodic work updates to receive phase-wise funding. Currently, one of the teams has updated their work to obtain the initial phase of funding.

We have also secured promising external funding to fuel the further growth of technopreneurship projects in the institute through Technovation.

Technical Summer School (TSS)

This year Career Cell conducted Technical Summer School in collaboration with the Institute Technical Council with a wide range of courses that saw more than 2700 participants. This year we introduced several new courses, namely Aircraft Design and Stability Analysis Using XFLR5, Controls Theory Bootcamp, SynBio, Matlab and Simulink Workshop, Blockchain and Computer Vision. TSS is an integral part of Learners' Space, where one can learn and choose from an assortment of courses that develop some of the necessary applied skills required to build a strong technical profile.

COURSE NAME [Conducted By]	REGISTRATIONS	DESCRIPTION OF COURSE
Tinkering Bootcamp [Tinkerers' Laboratory]	170	The course covered everything from coding to demonstrations of hardware implementation. Students were taught simulation of devices on online platforms and how to install and code on IDEs, compatibility, limitations, and uses of hardware, Arduino, Internet of Things (IoT), RaspberryPi (RPi) through live sessions, challenges, projects, assignments, and talks.
Aircraft Design and Stability Analysis Using XFLR5 [Aeromodelling Club]	80	The course was designed so that any person having little to no information about aeromodelling, but having the thirst to learn a bit about it, gets to know what goes into the theory of building a fixed-wing aircraft (RC Planes).
Controls Theory Bootcamp [Electronics and Robotics Club]	165	By the end of the course, students were versed with the basics of Control theory and its vivid applications, the use of software such as MATLAB and Simulink for solving interesting engineering problem statements, PID Theory, Inverted Pendulum as a controls case study, etc.

Technical Summer School (TSS)

COURSE NAME [Conducted By]	REGISTRATIONS	DESCRIPTION OF COURSE
SynBio [BioX Club]	70	Synthetic Biology is an innovative field bringing together subjects like biology, biotechnology, genetic engineering, computer science, engineering and design to create useful tools to solve everyday problems. A new team will be organised soon for the iGEM Competition, an annual, world wide synthetic biology event aimed at undergraduate university students; the knowledge students acquired in this course can also be implemented there.
Python and its Applications [Web and Coding Club]	485	This course helped students to dive deeper into some of the concepts & libraries that prove to be extremely useful in the journey of Python. It introduced them to some of the fundamental concepts of python and then helped apply them in fields like Data Analysis, Game Development, Natural Language Processing and Scientific Computing.
Fundamentals of MLOps [Web and Coding Club]	227	This course introduced students to some of the core ideas behind combining the long-established practices of DevOps with the emerging field of Machine Learning, various stages of the ML model lifecycle, including data versioning, experimentation, evaluation & monitoring.
Introduction to App Development [Web and Coding Club]	371	This course was an introduction to App Development using Google's Flutter SDK which is used for crafting beautiful applications using a single codebase. By the end of this course, students became fluent in programming in Dart and were ready to build their own Flutter apps.

Technical Summer School (TSS)

COURSE NAME [Conducted By]	REGISTRATIONS	DESCRIPTION OF COURSE
Matlab and Simulink Workshop [Tinkerers' Laboratory]	272	The course aimed to familiarize students with the application of Matlab & Simulink and demonstrate solving some real-world problem statements through live sessions, challenges, projects & assignments. There was some hardware involved, and that helped them explore Matlab & Simulink in a totally new way.
Energy 101 [Energy Club]	75	This course covered the various types and utilities of sustainable energy as well as its importance in our daily life. After completing this course the students got accustomed to different aspects of energy and how to utilize them. It also helped in boosting energy-related knowledge and their practical utilities.
Blockchain: Energizing the Future [Energy Club]	185	In this course, students tried to find energy consumption in crypto mining, basics of blockchain, and use of the energy-block chain in different sectors like EV, building & industries. They were made aware of energy tokens like the energy web and were shown how various new cryptocurrencies are doing energy-efficient mining.
LaTeX [Rwitaban Goswami and Vinayak Saxena]	353	An introductory course to get you started in LaTeX. This equipped the students to make good looking typeset reports and resumes, with the proper knowledge, terminology and resources to understand and write advanced LaTeX.
Computer Vision [Rwitaban Goswami]	302	This course provided the platform to learn the introductory material of Computer Vision, with old as well as SOTA algorithms. With the knowledge students gained from this course, they were equipped to forage into the vast field on their own, and possibly reach new horizons

Internships and Industry Technical Projects

Intended to give students more opportunities to work on the technical side, we planned to organize Internships from ITC's side, as was done in the earlier tenures. While there were (comparatively) many opportunities for the winter cycle, we felt an acute lack of In-Semester options for students. To address this issue, we launched the Industry Tech projects Initiative, which complemented the existing set of summer and winter internships provided by ITC.

The primary features of the Initiative were:

- The projects would be restricted to the technical domain to not divert from the original vision.
- We would highly encourage the companies that we partner with to give opportunities to as many branches and batches as they can.
- We would also provide complete flexibility on the duration of the project, and if our partners want to extend additional offers to a student, they are free to do so.
- We try to get the internships posted on PT cell's blog so that maximum students are aware of the opportunities.
- If the internships could not be floated via PT cell, we have floated them in the new 'External Blog' in InstiApp.

Our primary focus is to partner with startups led by IITB alumni for two reasons,

- The chances are relatively higher of successfully partnering with them.
- The chances of misuse of the opportunity from the company side would be lower, and we can trust that the students would enjoy their internship experience.

We have received offers from a total of 5 companies for Internships: Atomberg, Lightstone, Anakin, Assert Securetech, and Wings EV, and for the Industry Tech Projects initiative, we have successfully partnered with five companies for a total of 7 roles. Thirteen IAFs have been floated through the PT cell, and a couple of internships were floated externally. It was also heartening to see a lot of responses from the students' side for these initiatives. In total, around 34 students received internship offers from this initiative. Moreover, four companies are still in the process of selecting candidates, so we expect the number of students impacted positively by this initiative to increase significantly.

Further developments

- An increase in the number of companies
- A shift to bring the summer internship opportunities earlier, i.e., in late Autumn or early in Spring semesters
- Increase awareness of the initiative and the External Blog in general.

Technical Laboratories

Under the phase 1 upgradation of the Student Activities Centre (SAC), in the next few years, new facilities will be added and the older facilities will be upgraded.

The plan for the new student technical activities' facilities in the SAC includes the development of the following labs with the total budget of around Rs. 1.5 crores for the inventory:

Robotics, Astronomical Observatory, UAV, Computation, AI and DS, Biochemical, Manufacturing, Phys IQ, Electric Mobility

ITC team proposed the detailed equipment list with vendors, etc for each of these labs. We are expecting the purchase of all the inventory by the end of this year.

'96 BATCH LEGACY PROJECT

The 1996 batch of IIT Bombay has generously pledged a support of Rs 17 Crores to carry out legacy projects, a part of which is also committed to the technical teams and clubs, which would help them to participate in global competitions. The batch is currently signing MOU with Development and Relation Foundation, and then the funds would be allocated.

Technical Teams Initiative

\$100 Million Carbon Removal XPrize - SAS IITB

IIT Bombay Team Gets \$250,000 Grant from Elon Musk Foundation at COP26 Summit



Team of students and teachers from IIT Bombay represented India at the conclave (Representational Image)

SASIITB, which represented India in the competition, won the grant for creating a tri-modular technology for removing carbon dioxide on a large scale.

- TRENDING DESK ● MUMBAI
- LAST UPDATED: NOVEMBER 16, 2021, 11:53 IST
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EDUCATION AND CAREERS DESK

Faculty members and students of the [Indian Institute of Technology \(IIT\) Bombay](#) have won a \$250,000 grant for creating a tri-modular technology for large scale carbon dioxide removal from source points of emission and changing them into salts. The grant has been awarded to a team of students by the XPRIZE Foundation, a part of the Elon Musk Foundation at the COP26 summit in Glasgow. The student team is also known as 'SASIITB'. It comprises Srinath Iyer, Anwesha Banerjee, Srishti Bhamare and Shubham Kumar.

Technical Teams Initiative

The X-Prize for Carbon Removal is organized by Elon Musk's Musk Foundation with a total prize money of \$100 Million, out of which \$5 Million is dedicated towards student teams. Team from IITB to participate in the competition was started by ITC in June'21. And one of the subteams - SAS IITB - has become one of the winners for the student competition. They have won a prize money of \$250,000, and are eligible to participate in the larger competition where they have to build and demonstrate the solution they proposed.

SPART

A new technical team emerged from the efforts of ITC and the guidance of ITC faculty advisor Prof. Pant with the goal of World Solar Airship Race (<https://wsar.info/>) scheduled in 2023. ITC was involved in the formation and ideation phase. Once the team structure was finalized and the work was started, the team was handed over to the Professor and the team leaders. Now, the team comprises around 15 members and is working actively towards the competition.

Bombay Boring Team

Not-a-Boring Competition is a competition held by The Boring Company, and it invites student teams to build machines to dig tunnels. The team is planning to participate in the second edition of this competition, which is going to be held in January 2023. Currently the team is in the very initial phase, with the target to submit the phase one report.

Make-a-way projects

The four projects were launched with the theme of transportation and demonstration of advanced technologies. The registrations were open for sophies and freshies and around 100 students in total registered for the projects.

The projects are expected to be completed over summers. The final goal is students learning hardware design, manufacturing and challenges in the process.

Projects-

1. Railway: Replicate the Mumbai local model as much as possible, making the whole system automatic.
2. Road: Design and manufacture a scaled-down version of the automated Mumbai Bus Rapid Transit System (Single lane, multiple exits)
3. Aerial: Make a small helicopter model and add controls such that it can hold its position and navigate as commanded
4. Ship: Build a solar-powered ship and navigate it to the commanded destination in 'not-so-calm' water

InstiX was launched as a group of motivated students building hardware-based products deployable in the institute, which could help solve some prevalent problems.

The structure of the group is a project head and no more than 10 students working under them for one particular project.

Over the past year, the ITC team has already worked on a few projects internally. The upcoming project planned is 'Smart Laundry'. A project head was appointed and the recruitment for this particular project is going on. The students are being selected in the domains- 1. Electronics/ Embedded System, 2. Software, 3. Product Design

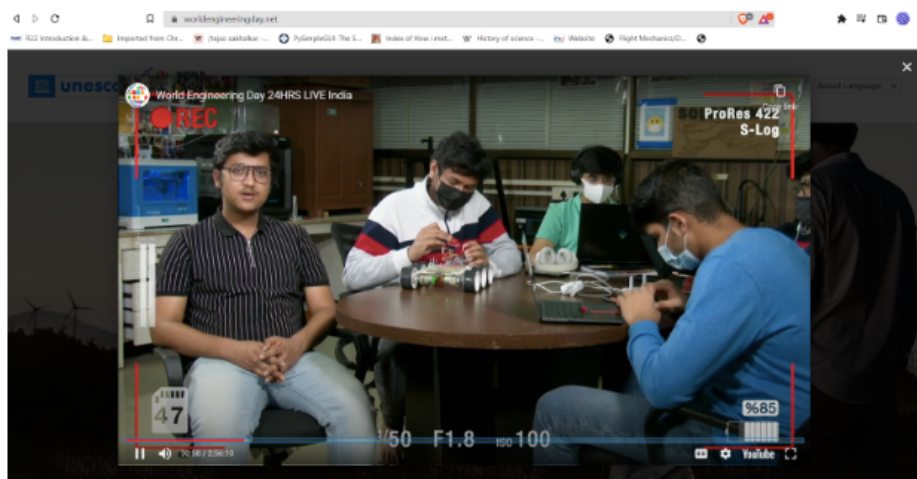
The detailed analysis of the project is complete and the design of the system is going on.

World Engineering Day

The World Engineering Day (<https://worldengineeringday.net/>) for Sustainable Development was proclaimed by UNESCO at its 40th General Conference in 2019. It is celebrated worldwide on 4th March of each year since 2020 as a UNESCO international day of celebration of engineers and engineering.

The day offers an opportunity to highlight engineers and engineering achievements in our modern world and improve public understanding of how engineering and technology are central to modern life and for sustainable development.

IIT Bombay was chosen as one of the eight hubs over the world. We got a chance to demonstrate the technical work that we are doing in IIT. ITC took lead of one of the three sections of the hub livestreams (can be found here- <https://youtu.be/sKp7vKY9FAE>) Four technical teams and tinkerer's laboratory were involved in the video making and this video was live streamed all over the world on the 4th of march.



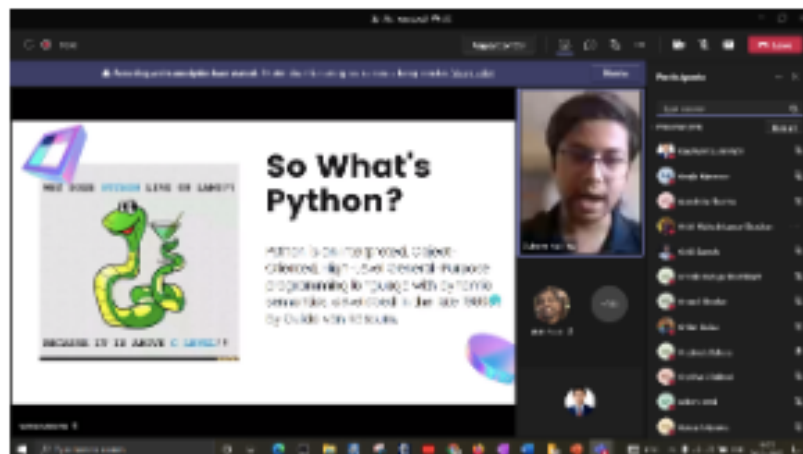
The diversity of students in terms of program (B.Tech/ M. Tech/Ph.D. and others) provides a challenging yet interesting opportunity to design and execute events and activities for participants with different levels of expertise and varied motivation. One of the key objectives that ITC had focused on was to make postgraduate students in the institute inclusive in this dimension since the beginning. What follows is a non-exhaustive list of efforts in the same direction.

PG Tech Weekend 2.0

An exciting lineup of events exclusively designed for PG students made up the PG Tech Weekend 2.0. A total of 6 events consisting of interactive talks, symposium, coding competitions, and more saw a participation of about 600 enthusiasts.

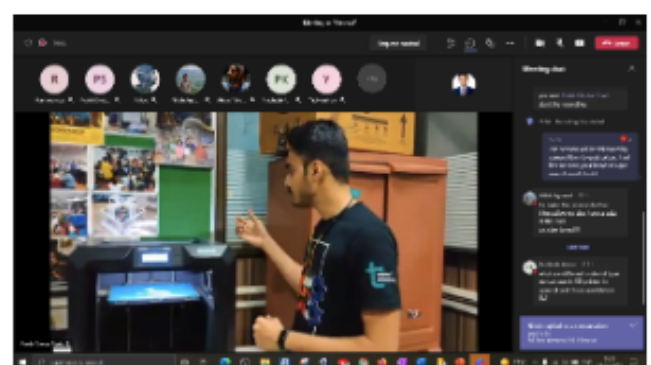
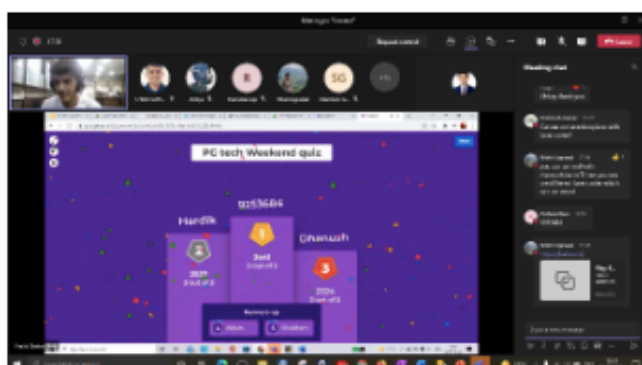
Get Pythonissed by WnCC

In this Python language learning workshop we ensured the participants get a glimpse of all the Python key concepts starting from scratch. In this workshop, we discussed Python Programmer experience and how it is used in the gigantic world of Finance. The workshop was followed by an engaging task given to participants. A Q&A session about the same followed. The event also saw a doubt clearing session hosted by our own WnCC Club Conveners.



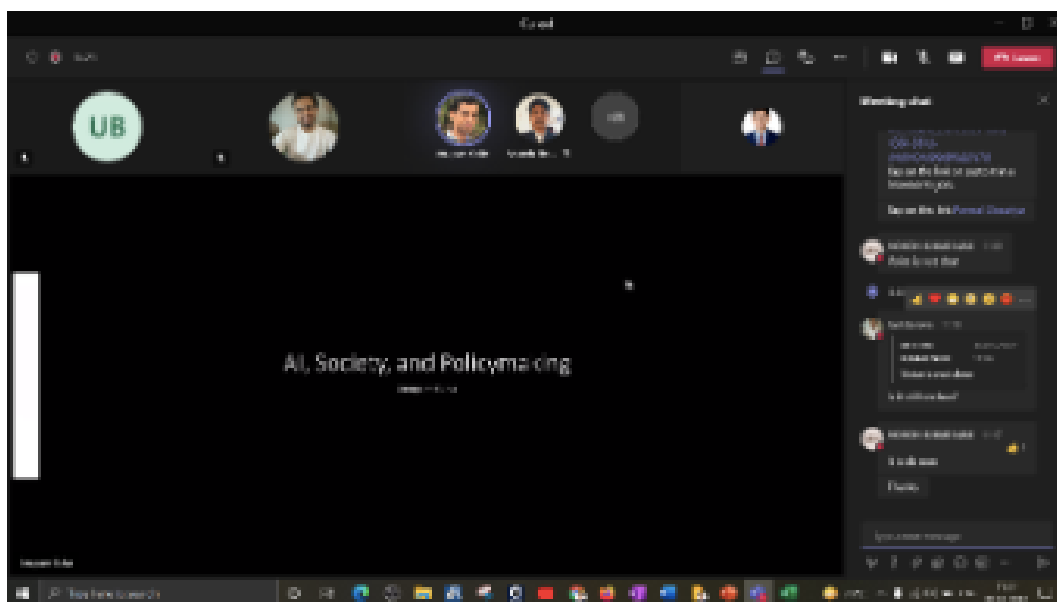
How Things Works? by Tinkerer's Laboratory

As a part of the PG Weekend, TL hosted the session with the theme of Additive Manufacturing vs Subtractive Manufacturing. Conveners demonstrated and explained the working, components of 3D printer and laser cutting machine in TL through video. Post session, the How Things Work competition was released.



AI and Sustainable Development talk by Team Shunya

A talk on AI and Society was given by Prof. Anupam Guha, Centre for Policy Studies. Mr. Ankan Karmakar, Project Engineer of Team Shunya and Ph.D. Scholar at Civil Engineering Department spoke about how AI is used in Construction Management. A very insightful Q&A Regarding opportunities in the field followed.



Crypt Hunt by Team Shunya

Team Shunya conducted Crypt Hunt, a race against time. The first who solved all riddles was declared as a winner.

Chemist's Symposium by Chemistry Club

The event was inaugurated by Prof. Tapanendu Kundu, who encouraged students and praised this initiative. First Chemist's Symposium was hosted exclusively for PG students to showcase their research work in front of an enthused, academic audience. The theme was general, interdisciplinary and included a review of cutting edge technologies in the intriguing field of chemistry.



Constrained Optimal Control and Approximation Theory by CDS-SRG

More information in the CDS-SRG section of the work report.

Institute Technical PG Projects aka ITPP 2022

This was a first-of-its-kind initiative for postgraduate students spanning for about 1 month in March. The students were asked to register individually or collaborate with their peers to register as a team (consisting of 3 members) and submit an idea. The most feasible ones were selected on the basis of problem statements and individuals with matching interest were clubbed together to form a team. Due to the constraints, projects were either software or simulation based. Closed groups of each team were formed on MS teams and teams were encouraged to share their problems while doing projects.

The timeline was as follows:

1. Submission due date to register and submit idea: 4th March 2022
2. Team introduction meet and doubt clarification: 8th March 2022
3. Project scope statement submission: 9th March 2022
4. Documentation including resources used and subsequent citations submission: 11th March 2022
5. Live demonstration of project progress: 20th Mar 2022 and 23rd March 2022
6. 4- pager documentation summarising the project and answering questions: 31st March 2022

PG Tech Enthusiasts Groups

A group with 210+ tech enthusiastic members consisting of different department representatives was maintained for communicating upcoming events and addressing doubts regarding the events. Occasionally, interesting resources and news were shared to keep the audience engaged and to promote group bonding.

Regular feedback collection

Feedback forms to understand the view of PG students were floated multiple times in the year and after events like PG Tech Orientation and PG Tech Weekend 2.0 . The doubts were addressed and suggestions were taken into consideration. Such interactions helped to make decisions on the kind of events that would be liked by PG students. Overall, the Council and PG Nominee were always open to hearing from students over formal and informal platforms.

Aeromodelling Club BioX Club
The Maths and Physics Club Tinkerers' Laboratory
CDS-SRG Web ChemE TL Creatives and Media
Web and Coding Club
Design Krittika Energy Club
Electronics and Robotics Club Chemistry Club

Club Reports



Aeromodelling Club

ONLINE EVENTS

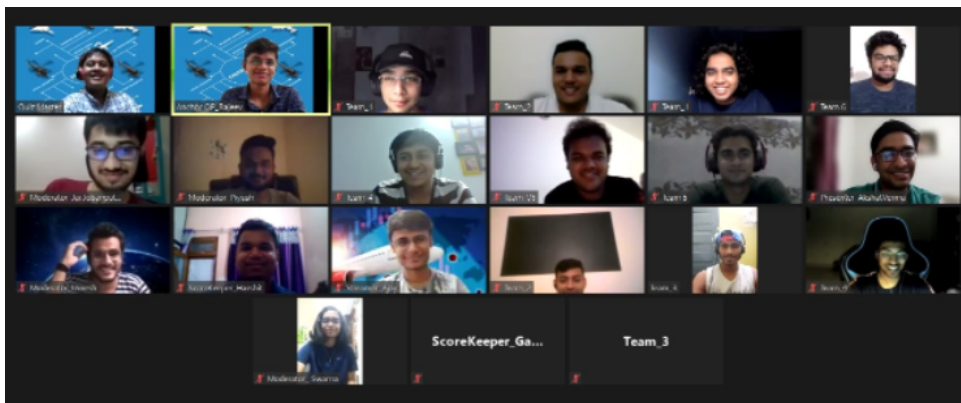
BOEING AEROMODELLING COMPETITION

We, in collaboration with Boeing, organized West Zone National Boeing Aeromodelling Competition 2021, wherein we organized 4+ webinars for explaining the problem statement and clarification of doubts of 120+ pan India participants. The problem statement encompassed fabricating a fixed-wing model unpowered glider with a catapult launching mechanism, the aim being to maximize the endurance/flight time with the given constraints. Owing to the pandemic situation, the competition was held remotely wherein participants had to demonstrate their project by submitting recorded videos of their glider models.



TRIVIAJET

Trivia Jet 2.0 was organized in the month of July 2021. The event was an online quiz covering a wide range of topics, from airplanes and aviation history to rockets and launch vehicles. The quiz engaged 80+ teams or 120 + participants from all over the nation. It was organized into two stages.



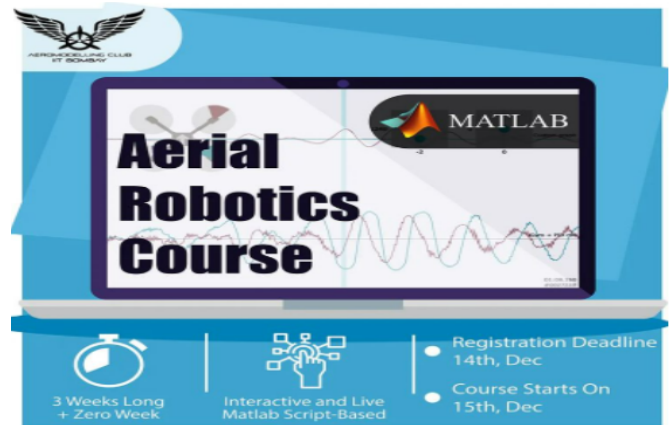
AEROCAST

Aeromodelling Club collaborated with Controls And Dynamical Systems Student Reading Group (CDS-SRG) to organize a talk series-Aerocast. The series comprised 4 episodes. In each episode experienced speakers with a multifaceted technical background spoke about various topics which included: 1) Thrust vectoring mechanism 2) Autonomous drones 3) Ornithopters 4) VTOL. At the end of each episode, technical projects were launched on the associated topic, and enthusiastic students were given an opportunity to apply for their projects of interest. A team was formed for each project and mentors were allocated for the same.

Aeromodelling Club

AERIAL ROBOTICS

Students were given an introduction to the mechanics of flight and the design of quadrotor flying robots using which they were able to develop dynamic models, derive controllers and synthesize planners for operating in three-dimensional environments. They got insights by seeing real-world examples of the possible applications and challenges for the rapidly-growing drone industry. Total 140+ registered for the course out of which 13 completed all the three assignments and earned certificates.



GLIDER MAKING WORKSHOP

We organized glider making workshop on the day of club orientation for first year students to give them hands-on experience. 300+ freshers enjoyed the event and took videos of their flying gliders. They were taught basics of flight. We involved sophies and thirdies to mentor the freshies through the session.

AEROMODELLING INDUSTRIAL TECH CHALLENGE (GC)

This year the Industrial tech challenge is organized in October instead of the regular general championship(GC) with a problem statement given by Drona aviation involving obstacle avoidance using UV sensors and PID control. Participants were introduced to the platform in a step-by-step and organized way with a detailed introduction and instructions for learning.

The competition was divided into two rounds, where in the first round participants were required to come up with an algorithm that would help in the integration of UV sensors and using them in 2D obstacle avoidance without the use of loops, 5 teams from this round were selected and were then given a pluto drone to integrate their code with it and to complete the PS with it.

ASCENT: ROCKETRY DESIGN COMPETITION & WORKSHOP

Aeromodelling Club organized a rocketry workshop targeting freshies and sophies to teach principles of rocketry and designing & simulation on Open Rocket Software. After the workshop, a problem statement requiring achievement of a minimum apogee with minimum payload using G Class Motors was released. Total of 17 teams (60 + participants) participated in the workshop and the competition. The final competition included a presentation on their final design. The Top 3 teams and two special mentions were declared. Winner Team would get a Model Rocket Kit.



Aeromodelling Club

OFFLINE EVENTS

RC PLANE: FLAGSHIP EVENT

We conducted an RC plane event even in an online semester for those who are on campus and interested in aeromodelling. This year more than 40+ teams (160+ students) took part in this event. To get clear with the theory before the practical, we conducted an orientation to explain all the concepts of flight, structure, and nomenclature of the plane. After organising the design session to give essential information about things to keep in mind when making an RC plane, we organized a simulation session. In that session, every student was given a chance to fly a plane using aerofly simulator on his or her laptop using the cable and transmitter provided by us. We also organized the practice flying sessions before the main competition. Alas, the much-awaited RC plane competition was organized on 26th and 27th of October. Prizes were awarded in presence of R.K. Pant Sir.



PITSPOT (HOSTEL 3 FLYING SESSION)

A Plane Building, Repairing, Simulator, and Flying session was organized in the post-midsem week. Planes were built and repaired overnight on the basketball court of Hostel 3, simulator practice done in Lounge Room and RC Planes soared high in the skies of Gymkhana in the weekend. It was a fun night out with flying enthusiasts.

LUKKHA FLYING SESSIONS

Lukkha Flying Sessions are organized every weekend where flying enthusiasts from all batches come and enjoy the art of flying, after building the beautiful RC Planes.

INVENTORY MANAGEMENT

The perfect count of the quantity of all items present in the inventory is now complete and we have a proper track of everything now.



Aeromodelling Club

COMPETITIONS

BOEING NATIONAL LEVEL COMPETITION

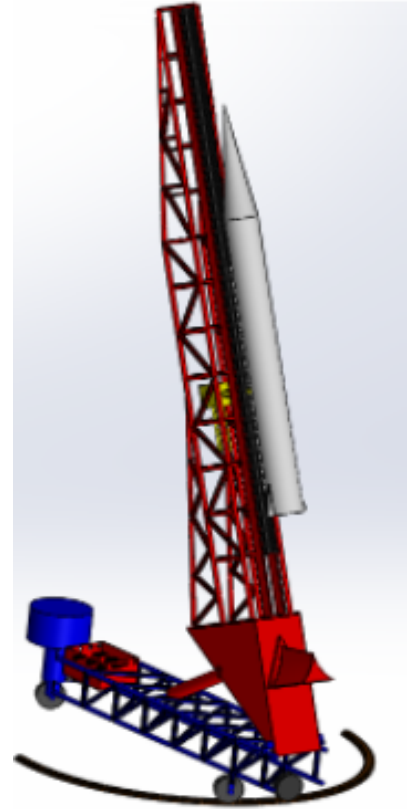
Participating for the first time in 2021, Harshit Singh participated, designed, fabricated, and demonstrated a fixed-wing model unpowered glider and a launcher with given constraints that can achieve maximum endurance/ flight time.

The final video was made with a flight time of 24 seconds and he won the competition in Silver Category.

AEROSPANZA

A team of four club members(Piyush Porwal, Anjali Antil, Ajay Tak and Akshat Verma) participated in the national competition Aerospanza-organized by SRM Institute of Science and Technology in sponsorship by STAR. Our team achieved the first-runner up position there.

Optimized truss structures were used for the major structural components for mechanical integrity. The team worked on retractable wheels. The project also included the CAD modeling of the launch pad and its mechanisms and the different components were simulated for load-bearing capacity. The range of the launch was highly improved than the existing designs and was appreciated by industry professionals.



SYNODIC ROCKET CHALLENGE

This project was done as a part of the national competition- Synodic Rocket Design Challenge organized by the Synodic Space Settlements Pvt. Ltd which involved the design of a single-stage reusable model rocket using solid rocket boosters. Our team (Akshat Verma, Rajeev Dhurandhar and Isha Mukherjee) was placed at the second-runner up position. The model rocket for this project was designed using the software OpenRocket aiming at maximizing the apogee and the payload capacity of the rocket under the provided fuel and size constraints.

An extensive performance analysis was performed for the rocket for parameters like vertical motion profile, roll stability and many others to improve the design further.



PROJECTS

TILT ROTOR VTOL

Team: Akshat Verma, Rajeev Dhurandhar, Bokka Krishna Kishore, Himanshu Patil

This project, in collaboration with CDS-SRG, consists of the design and build of an RC Transitioning Vertical Takeoff and Landing (VTOL) aircraft with a tilt-rotor mechanism. The aircraft takes off vertically without a need for a runway following the properties of rotorcraft and then transitions to the cruise mode by tilting the front rotors forwards and follows the properties of a fixed-wing UAV thereafter.

The project has involved the conceptual to the detailed design of the aircraft extensively using XFLR5 for its aerodynamic analysis, the CAD modeling of the aircraft and tilt-rotor mechanism, and formulation and simulation of its control system using MATLAB.

Quadcopter (Harshit Singh)

The focus of the project was to make a quadcopter from scratch or more specifically, an Arduino flight controller. This was achieved with the help of the MultiWii project which is one of the first open-source projects which gained popularity as a multirotor flight controller firmware. It started with a hack that used an Arduino pro mini and the IMU of a Nintendo game controller (Wii Nunchuk) to make a flight controller for multirotor (first was a tricopter). Revisions of the flight controller PCB, adding new components, and trying a different quadcopter configuration (Y4) also added to the project.



Flying Wing (Harshit Singh)

The main focus of the project was to manufacture a flying wing which is simple in structure, small in size, fast and durable for a fun flying experience. It started with getting familiar with such aircraft, researching past designs and creating a base CAD model for our design.

Later after the design was finalised after a simple stability analysis using XFLR5, electronic components were decided and fabrication of the wing started. I learned cutting airfoils out of foam using an electrically heated wire, covering the wing in paper so that resin (to be used to fiberglass the wing) won't be soaked in the foam. The center pod is cut using hot wire and shaped by hand through sanding, treating it with paper the same way.

DRONE (Umesh, Anjali)

A drone that uses path planning, obstacle avoidance, object detection was designed by our convenors Anjali and Umesh. It can be used for surveillance in disaster affected zones when humans are difficult to reach.

Aeromodelling Club

SOCIAL MEDIA HANDLES

FACEBOOK

Maintained the already existing Facebook page of the club. The informative posts included the Ingenuity helicopter, Multiwii flight controllers, ornithopter, passenger space shuttle, shape memory alloys, control reversal, morphing wings, and many other developments.

The current reach of the page has increased to 7.9k.

YouTube

Revamped the youtube channel by making the comment section more active. Added the about section to the youtube channel. Started to work on the discussion channel. Started a Youtube Series named misconceptions on aviation in which there are currently 2 episodes. 1st misconception was about the misconception regarding the generation of lift, by the wings of an aircraft. 2nd misconception video is about the concept of dihedral and how dihedral stabilizes an aircraft's roll motion.



INSTAGRAM

The Club's Instagram page has had a good reach owing to the online semester and increased number of students in social media. We started two series : 'This Week in Aviation History' and 'Did you Know' which had a great reach. Some stories with quizzes were also posted to keep the followers engaged and to have a better interaction. Some interesting reels too had a great response. Currently the page has 1200+ followers and are increasing day by day.



INTRODUCTION

BioX Club, IIT Bombay, is a student organization that, through its events, workshops, and talks, strives to increase students' level of enthusiasm and knowledge for diverse fields of Biology and, therefore, to make a community of bio-enthusiasts.

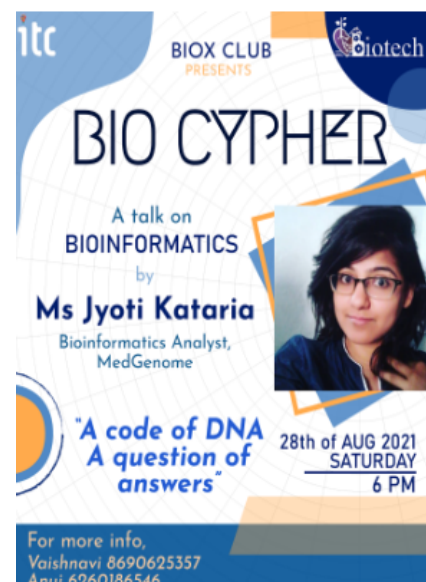
The main aim of this club is to highlight the link between biology and engineering and thereby provide a better answer to how we as engineers could contribute to the healthcare sector.

In this tenure, the club executed numerous events and activities. We drafted a course on Synthetic Biology in the TSS and made good progress in establishing Team iGEM, IIT Bombay.

EVENTS AND TALKS

Bio-Cypher (28th August 2021)

BioCypher was held on 28 August. The Speaker of the event was Dr. Jyoti Kataria, a bioinformatician at Medgenome and alumni of IIT Bombay. This event was not only for IITB Students but also for other college students. We prepared a database and sent a message to bio clubs of different colleges. This served as a base for our upcoming event Code On. She provided a deep insight into bioinformatics, career options available in this field, and many more. We unveiled Code On at the end of BioCypher, by releasing an intro teaser and beginning pre-registration.



Code On (22nd-23rd September 2021)

It is a coding competition based on bioinformatics. Here the participants had to code genome sequences of marvel avengers. Four characters, i.e., Spiderman, Green Goblin, Lizard, and Rhino, were there. And this created the theme of the event to be “Spidey-Verse.”

Timeline of the event :

1. Pre Registration

The execution began with a pre-registration period initiated after Bio-Cypher. **We planned to provide a few more problem sets and extra 6 hours to the pre-reg candidates.** We didn't formulate any mail for the pre-reg, as we wanted to benefit the enthusiastic candidates of the club.

2. Publicity and Registration Starts

Midsems separated the pre-reg and reg periods. After the midsems, publicity and registrations began. We received an enormous number of **260+** registrations for our first event, which was a massive success.

3. Briefing Session

We hosted a briefing session 1 hour before the event where we provided all the info regarding CodeOn, disclosed the extra time given to pre-reg candidates, gave a hackerrank tutorial, and quickly went through all the rules and regulations.

4. Event

The problems of the different characters were almost the same. We did not get any assistance from any proficient person with coding, which created difficulties.

5. Bonus Round

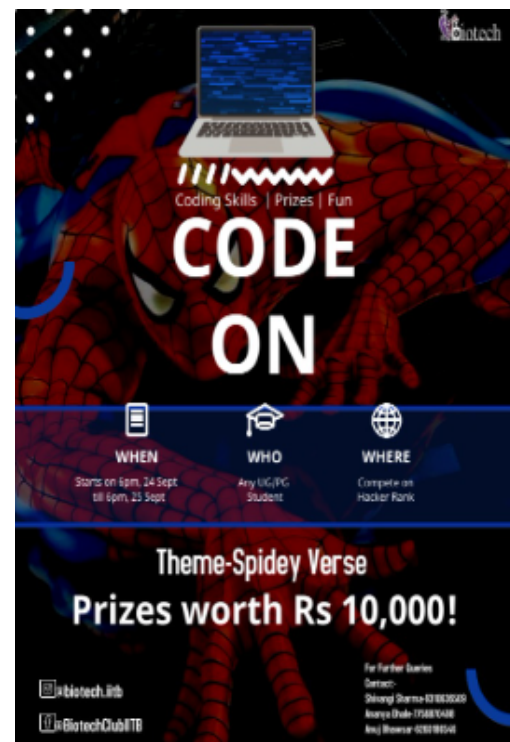
After 24 hours from the event's commencement, we started the Bonus questions round. As many candidates who worked hard for the competition but did not pre-register, we ensured they didn't feel unprivileged. There were just three questions worth ten marks, so the bonus round should not create a huge difference.

Arcano (24-25th December 2021)

It is a two-round event organized as a part of Tech weekend exclusively for freshies. The first round was a day-long crypt hunt organized on the D2C platform and was open to all freshies. 50 tricky and mind-boggling questions involving school-level biology concepts were put before the teams.

Round 1 was commenced at 11.30 pm on 24th Dec, and it went up to 25th Dec evening. Around 45 teams participated in round 1 of Arcano, and we got really good feedback from them. Some questions were tough, and most of the teams were only able to complete 42-44 out of 50.

The briefing session of this event was held along with the BioX orientation, where all the rules were explained, and queries of teams were solved. WA group was also formed, which was used to provide hints and maintain better contact with participants.



After Round 1, the top 6 teams were selected. Round 2 was even more interesting and fun-filled. It had 2 parts; scribble round and buzzer round. Round 2 was held on Zoom.

In the scribble round, one team drew something related to the guess privately provided by the quizmaster, and others had to guess the correct answer. The team that gave the fastest correct answer was awarded the highest marks.



For the buzzer round, the questions were put before the teams for 30 seconds, and a google form was floated at the beginning where they could write their answers, and it was closed just after the round got completed.

Results were declared 2 days after round 2. We were delighted to see the enthusiasm of the freshers. They also appreciated and compared Arcano with Insti's biggest crypt hunts.

TECH TEAM

iGEM Team Initiation (September 2021)

iGEM is a worldwide synthetic biology competition. Various Indian colleges have their iGEM teams. We discussed establishing the iGEM team of IIT Bombay. We just created a blueprint of what needs to be done before starting an iGEM team. Conveners' transparent and honest opinions were taken to ensure they knew the outcomes (pros and cons, time commitment). In the beginning, all of us had a very vague idea about this, and we planned to meet with some other institute that has a well-organized iGEM team.

We organized a meeting with the **iGEM head of Manipal**, and he explained every detail of iGEM thoroughly. That conversation was terrific for us as we grasped all the dos and don'ts for iGEM. This was our first inter-college meet. We have gone through the iGEM handbook and have begun searching for a **faculty advisor**. We have acquired quite a good amount of information on synthetic biology.



CLUB ACTIVITIES

Convener Training (June- July 2021)

Convener Training was one of the most prolonged activities conducted in the first half of tenure. The whole convener training was divided into three phases :

- 1st phase involved creating a database of various speakers who have done wonders in biology, drafting a mail template for inviting them, and creating posters for talk-show or events.
- 2nd phase was further subdivided into three checkpoints. This part involved profound ideation of our upcoming events. Leads were assigned for these events, and event-specific groundworks were held. The leads had to prepare the presentation with all the information regarding the event and its execution right from scratch. We also tried to develop innovative ideas that could lead to the event's success. This phase helped us a lot in planning many things and getting an idea about the time requirement of an event.
- Phase 3 included team-specific activities such as creating logo drafts, a teaser for our first event (that was decided to be Code on), ideation of the first five Instagram posts, a team post, a caption for our first event, etc. This phase helped a lot in building the team spirit because carrying out a particular task always involved collaborating with two or more teams.

This part of tenure played a significant role in grooming the newly selected conveners and providing them with the proper skill set to contribute to the club better. Also, the whole convener training was drafted in competition to keep the motivation of conveners high!

Logo Revamp (Dec 2021)

The Biotech club earlier was renamed to BioX club, signifying that Bio could be clubbed to any field, be it biomechanical, biochemical, etc. This attracted the attention of a large number of people as the new logo was far more lively and captivating. Transforming the logo is not an easy task as you have to keep in mind that the club will use this logo for years.



Hoodie Design (October 2021)

The club's official hoodie for conveners and secretaries was also designed in this tenure. Leads were assigned to create virtual designs, communicate with the vendor, watch the hoodie's quality and price, etc. The design of Hoodie took a lot of time and effort from our side as it should be something that could motivate the conveners to do their best.



T-Shirt design (Mar 2022)

The design of the club's first official merchandise, the BioX T-Shirt, was also initiated. These would be presented to the winners of club events which could serve as an excellent means of outreach and enhancing BioX community.

Website making (Apr 2022)

Efforts are being made to revamp the official BioX website. The current website is very standard and does not possess many features. Meets were held with the Web Team of ITC, where the leads discussed their ideas with web conveners and managers. The website's front-end and back-end development is in progress and will be completed within a few weeks.

Social Media

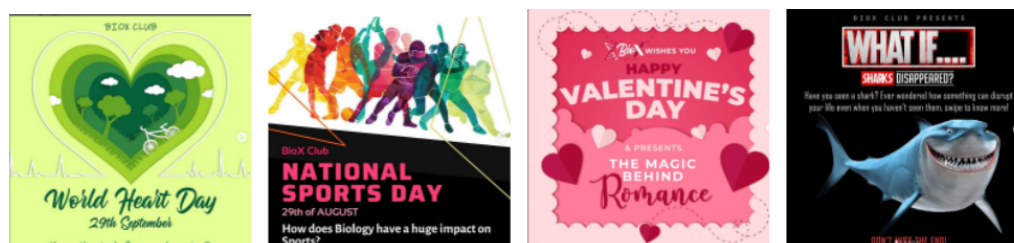
The social media handles of BioX clubs were much more active in this tenure when compared to the previous ones. We launched two new monthly series.

1. Genus of the month :

Biology consists of various fields which people with technical backgrounds often neglect. This series highlights one domain of biology every month, briefly describing it and telling about some exciting activities/research.



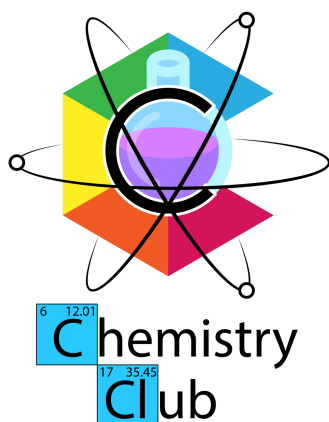
Apart from these series, we also create posts for various Bio related days/events. We always try to make the content as interesting as possible and are inclined more toward the technical side than the theoretical.



Our social media handles saw a huge upsurge in this tenure. Most of our posts were well designed and formulated to entertain non-bio-oriented people as well.

Chemistry Club

INTRODUCTION



Chemistry Club was started in 2019 with an aim to make Chemistry, one of the basic and central sciences, more appealing to the general audience by conducting various events and activities which will give the audience, a fresh new insight into Chemistry, without bogging down into technical details/jargon, and more into the intellectually stimulating and exciting aspects of it. The club also aims to provide Chemistry enthusiasts, a community and platform of like minds, where their ideas and love for the subject can be shared to, as well be part of exciting opportunities which the club will bring about through its initiatives.

TEAM

Team Chemistry

Om Mihani

Hiranmai Mohan

Aryan Gupta

EVENTS

SIG-ma (31st July 2021)



The Chemistry Club along with the D-AMP team of the Chemistry department have started a new initiative, SIG-ma, a special interest group for discussions on cutting-edge research and development in Chemistry. It also strives to provide the students a platform to share their own research and gain further insights. We conducted the inaugural meet of SIG-ma on 31st July and invited Prof. Nandita Madhavan and Prof. Chandramouli Subramaniam to conduct a talk along with Alok, one of the seniors from the Chemistry Department who shared aspects of his research experience. We also conducted fun quizzes on kahoot which consisted of interesting chemistry trivia. We had a participant turn out of over 80+ people.

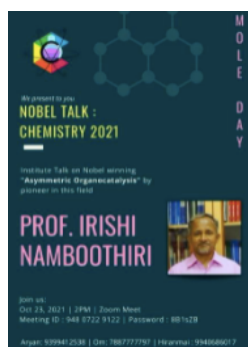
Paper Presentation Session (3rd October 2021)

As a follow up to the inaugural session of SIG-ma, we organized a paper presentation session which was a comprehensive talk designed to introduce students to the art of expressing your work of research or publication clearly to a large or specific audience. This session was conducted by Prof. Anindya Datta, one of the most well known professors from the Chemistry Department. We concluded the session by making an announcement regarding our next initiative, Symposium, through which we aim to provide students of any year of study to present their own research or their understanding of other research to gain exposure into one of the most important skills to have in academia. This event had a participant count of over 100+ consisting of people from all years of study.



Mole Day (23rd October 2021)

We organized 'Nobel Talks' on account of Mole day which is celebrated every year on the 23rd of October. This event aimed to give the students a deeper understanding on the recent development in Chemistry for which the nobel prize was awarded to Benjamin List and David Macmillan for their contribution towards Asymmetric Organocatalysis. This session was conducted by one of the most esteemed professors from the Chemistry Department – Prof. Irishi Namboothiri. We had a participation count of around 60 and a very interactive session.





Winter School of Chemistry (1st – 26th December 2021)

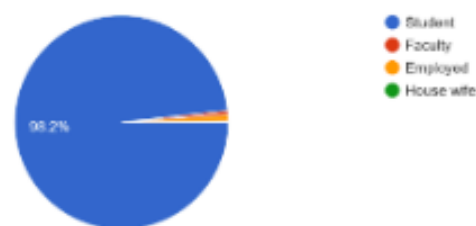
We successfully conducted the very first edition of our PAN-INDIA event, Winter School of Chemistry. We offered short crash courses on niche topics of Chemistry like Forensic Chemistry, Chemical and Molecular Biology and Catalysis. Seniors who were proficient in these fields conducted classes smoothly via online mode along with assignments and quizzes. The mentors were carefully selected for the same and were asked to provide a detailed course outline. Students starting from grade 8 were allowed to register with no upper cap for the age. We received over 500+ registrations in total from all over India and a few from abroad as well. These were spread out over a wide range of ages and years of study from grade 8 to doctoral and faculty members.

Link to website: <https://sites.google.com/iitb.ac.in/winter-school-of-chemistry/home>

Country of Residence
508 responses

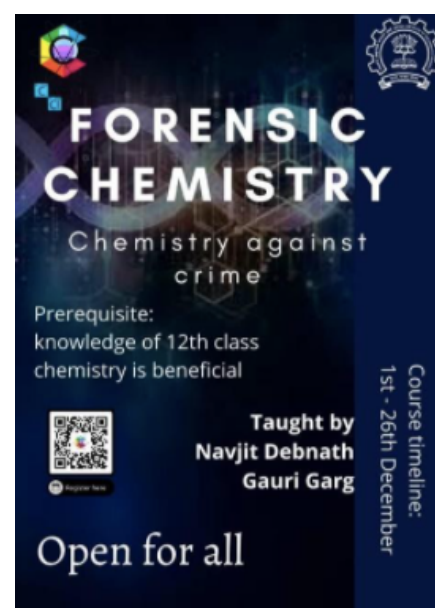


Profession
508 responses

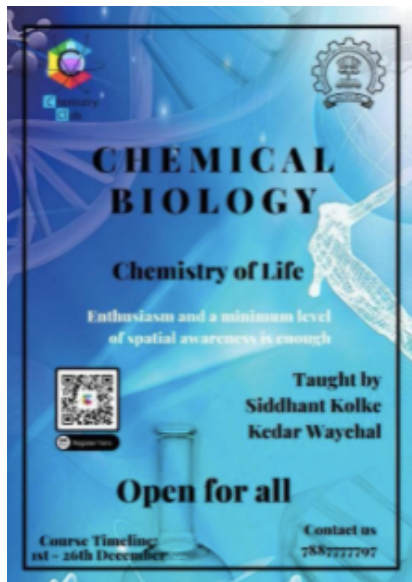


Forensic Chemistry

This course mentored by Navjit Debnath and Gauri Garg received 380+ registrations and was conducted via live online classes. At the end of every class, a quiz was conducted to test the understanding of the content of the current session. Assignments were provided regularly for the students to apply the concepts learnt in class while attempting real life problems. Concepts were taught by analysing real case studies of past crimes. Help sessions were conducted weekly for those who required some background knowledge for the class content to cater to students of all years of study. The comprehensive course content was designed based on various other resources. The course extensively dealt with topics like laboratory analysis, narcotics and evidence collection. We have received great feedback about the course and the mentors. We are currently working on the final evaluation and certificate distribution.



Chemical and Molecular Biology



This course mentored by Siddhant Kolke and Kedar Waychal received over 300 registrations and was conducted via recorded lectures and weekly interactive sessions. Quizzes and Assignments were provided to gain a better understanding of the material. The comprehensive course content was designed based on various other resources. The course extensively dealt with topics like evolution, DNA, RNA and Genetics. Along with theory content, the mentors also conducted sessions on the computational drug discovery software, PyRx. We have received great feedback about the course and the mentors. We are currently working on the final evaluation and certificate distribution.

Heisenberg (2nd January 2022)

For UG Freshers Orientation conducted this year, The Chemistry Club organized a 3 round quizzing event to win the title of 'Heisenberg'

Round 1: Fastest Reaction First – This round was conducted via google forms and was just a warm up round with somewhat basic questions.

Round 2: Say my Name! – This round was conducted on kahoot and the participants had to answer fun chemistry trivia as quick as possible.

Round 3: Buzzer Round: - This round was conducted on Buzzin.live where the top 8 contestants of round 2 were allowed to participate. Images based on general chemistry phenomena were shown and the one who pressed the buzzer first was allowed to explain.

The final winners were decided on basis of scores of round 1 and round 2 and were awarded the following prizes: JBL Speaker, Netflix, Amazon Prime, Spotify and Disney Hotstar subscriptions. We had a participant turn over of around 50 and the session was highly interactive with the enthusiastic freshers.



The Chemist's Symposium (30th January 2022)

We conducted our very first edition of the chemist's symposium during the PG Tech Week inviting speakers pursuing post-graduate at IITB to present their original research or review literature on any field related to or interdisciplinary with chemistry. We received their topics and abstracts beforehand. Prof. R.K Pant from the aerospace department and the faculty advisor of the ITC was the guest speaker and kindly inaugurated the event. 5 participants presented their topics within 15 minutes which included a Q & A session as well.



The session included the topics: Nano Particles for targeted drug delivery, Geochemistry, metagenomics, and physiology of the arsenic-microbiome interaction in Bengal basin aquifers, India, Using Machine Learning for Organic Reactions, Rigidity in Enzymatic Pockets, Design and Synthesis of Macrocyclic Toll-Like Receptor (TLR)-2 Agonists. The speakers were mostly students pursuing masters in chemistry and one speaker pursuing post-doctoral studies. We achieved a footfall of over 50 enthusiastic participants and successfully organized the event.

Link to the website: <https://sites.google.com/iitb.ac.in/chemistssymposium/home?authuser=5>

PUBLICITY AND OUTREACH



We created our twitter handle and are currently followed by multiple accomplished researchers in chemistry and related domains including professors from IIT Bombay, IISER Pune, IISER Bhopal, and multiple PhD students currently at places including MIT. The handle is kept active by posting frequent updates related to the events organized by the club and by retweeting other chemistry related posts or events. Our Instagram handle has seen a doubling in the number of followers in the past tenure and currently has 672 followers. We also started an account on clubhouse to encourage chemistry based discussions. The number of likes per post has also increased this tenure thereby making our overall publicity and outreach measures more effective and efficient.

INTRODUCTION

This year our club underwent a rebranding with a new logo. We had a proper logo reveal and updated our social handles with the same. Energy Club found its way to finally have an active LinkedIn with plans to become an active Twitter member real soon. The vision that the club had for this year was to reach out to Energy enthusiasts and communities outside the institute and help our institute enthusiasts to form bigger communities and capitalize the opportunity to interact with energy enthusiasts across the globe.

Rukhsat

A farewell was organized for energy club alumni of the passing batches. An interface was created in Gathertown for the same to enhance interaction. It was a closed, informal event for the previous club members and was an evening of fun, games and several stories.

The Sustainability Series

The sustainability series was an informative instagram reels series. This series contained one video for every letter of the word SUSTAINABILITY. Each reel would present some basic methods or ideas starting from that particular letter. The videos for the series were made collectively by all the team members. And the purpose of this series was to create some awareness about sustainability and the environment by creating engaging video content.

Climate Science Olympiad

Energy club conducted the qualifier of Climate Science Olympiad 2021 by Climate Change in association with UN Energy on 10th July 2021 for IITB students. Finalists of the Olympiad had the opportunity to attend the finals and UN Climate summit at Glasgow UK. The event was very well received and saw a participation of more than 75 students for the 3 hour long Climate case study competition. Students were challenged to find sustainable solutions to problems in 3 areas - (Sustainable Agriculture, Water Resources and Global Health and Development). Energy club also arranged resources and simulations to ensure that the participants were well prepared for the challenge and created a channel on our Discord server to enhance online interaction between participants.

No planet B: Story of Climate Change

'No planet B: story of climate change' is a podcast series released on the Spotify account of the energy club. This consists of a total of 4 to 5 podcasts with some eminent speakers from around the world, some technical teams from the institute, whose work is inlined with the study of climate change. Through this we planned to focus on the issue of climate change and how it can be controlled by shifting to green energy.

Energy GC:

Energy GC was conducted in the month of October. A mid-prep GC, its problem statement was designed in collaboration with Bosch based on the blockchain theme to give participants an insight into real life industry problems. Students participated in teams of 1 to 3, competing to win exciting opportunities like internships. An interaction session was held with executives from Bosch to explain blockchain concepts and provide more industry exposure to the participants.

Indian Oil Corporation Talk

In collaboration with IndianOil, the Energy club conducted an offline workshop on "Insights on Energy Industry Confronting Net – Zero Transition" with a brief touch upon the following topics.

1. Supply Chain & Price Management in the Global Oil & Gas Market
2. Energy Security with Focus on Indian Energy Basket
3. Impact of Oil & Gas market by/on Electric Mobility.

This Workshop was insightful in terms of Supply chain management, price management, global oil prices, their forecast, impact on/by EVs on the oil sector, energy security, and current global oil scenario.

The Workshop was scheduled for 30th March at 3 pm at LHC and had received more than 100 registrations.



PAN India Alliance

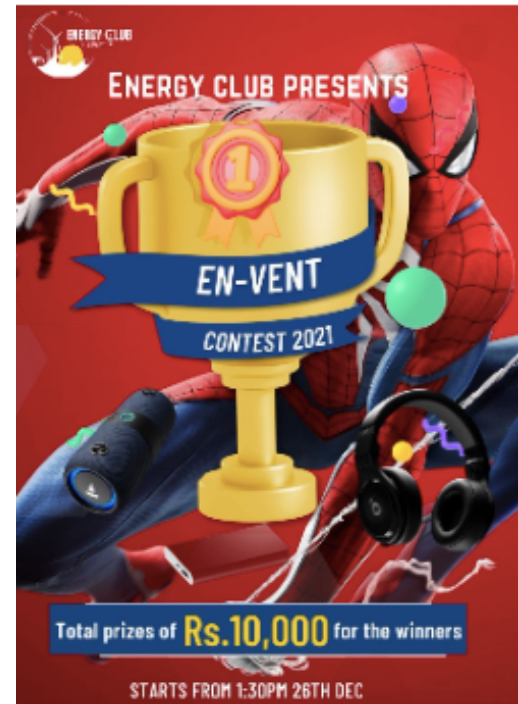
The ideology of the club to extend its reach nationwide started off with collaboration with esteemed institutes across the nation to form a collateral body. The founding base of the idea was formed by two colleges that are IIT Bombay and BITS Pilani. The expansion was then done to bring on board colleges like IIT Kharagpur, IIT Delhi, BITS Goa, Assam Engineering College, SRM University. Thus, now we have the core team ready and in the summer, the body plans to organize a nationwide MUN.

International Symposium

The International Symposium is planned to happen in the month of May. The collaborations between energy clubs of TU Delft, NTU Singapore, Durham University and IIT Bombay continues to get stronger and with several meetings and discussion, the plan of action and structure of the symposium was revised and structured. The long term goal of the alliance is to form a student representative energy alliance in the world and with Energy Club IIT Bombay leading the alliance in India.

Event

In the last week of December, energy club organized an event called event. The participants were allowed to make the team consisting from 1 to 5 members. Each team was given the task to design a suit for spider man consisting of special features with some constraints. The submission deadline was kept 1pm on 26th December. The winners were decided in the energy club introduction session which started on same date from 1:30 pm. Top three teams were awarded.



Energy Debate

On 31st August, last year we organized an online debate where all the energy enthusiastic students put their opinion about the modern issues in this field. The best participants were awarded.

Joules 3.0

Published Joules 3.0 which is an interesting and engaging newsletter containing interactive content. Joules 3.0 included the top 10 innovations, inside campus initiatives, energy encyclopedias, trivia's and other things.

Website- Revamp

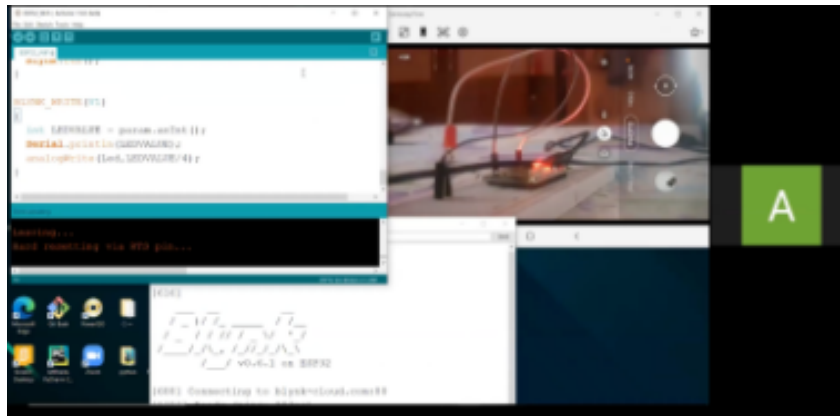
The Energy club website is completely revamped. The UI/UX of the website is beautifully designed with shifting of development from google site to angular framework. The site was made completely dynamic with a backend based on django.

<https://sites.google.com/view/energyclubiitb>

Electronics and Robotics Club

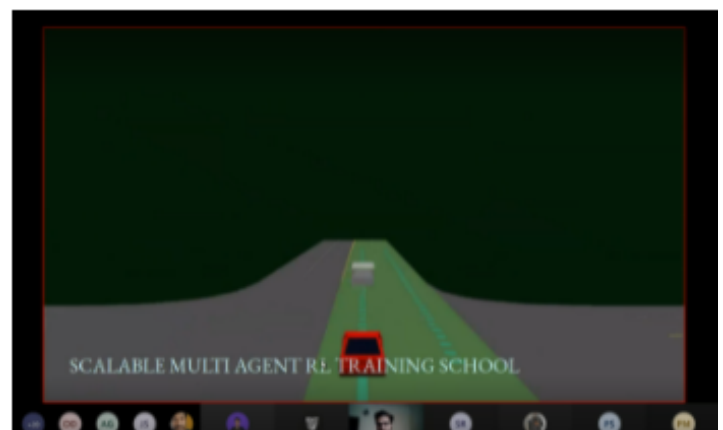
Tinkering Bootcamp

Tinkering Bootcamp was conducted by ERC in collaboration with Tinkerers' Laboratory. This bootcamp was focused on getting the participants acquainted with microcontrollers and an introduction to IoT(Internet of things). It started with an introduction to microcontrollers through Arduino in week-1, then introducing ESP boards with some communication protocols, Blynk App, RaspberryPi in the subsequent two weeks. Basic Solidworks was also covered in the last week-4. The workshop included teaching in live sessions with some live demos(as shown in the image above), and assignments given at the end of each week, based on some application of material covered in the week. The workshop saw a participation of around 200 students.



BLAH

The first BLAH session on 'Reinforcement Learning for Autonomous Driving' was organized on 28th August 2021. The speaker of the session was Dikshant Shehmar, a 4th-year student in the Civil Engineering department who had done a research internship at the 'Intelligent Robot Learning Lab', University of Alberta, Canada. The talk started with the basics of reinforcement learning and went on to cover other ideas such as multi-agent reinforcement learning and Proximal Policy Optimisation (PPO) algorithm. Towards the end of the session, intriguing simulations done on the Scalable Multi-Agent RL Training School(SMARTS) platform were demonstrated. Interesting questions were taken up and answered by the speaker at various key points during the session. About 40+ students attended the session and stuck around till the end, making it one of the highest attended BLAH sessions of all time.



Electronics and Robotics Club

XLR8

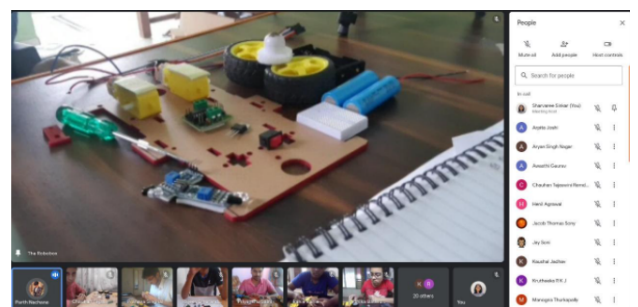
XLR8 was the very first hardware-based offline event of this tenure conducted by ERC in collaboration with Tinkerers' Laboratory following all the covid protocols. It was a competition-based month-long event where students were asked to build a suitable remote-controlled bot and run them on the track to compete for the fastest completion time. The track was constructed at the SOM Well and consisted of obstacles and hurdles like- rotating planks, marble dash, tires, roller, spiral staircase, and so on, each of them assigned different scores for passing the respective obstacle. The students were provided with the problem statement which included the specifications of the bot.

Two sessions namely- 'Get Mechanized' and 'Get Electrified' were conducted in slots to familiarize students with bot designing. Mentors were allotted to the teams to assist them with their designs, debug the bots, and help them with the hands-on process. The required hardware, circuit design, and scripted codes were provided beforehand for the bot and finally, some debugging sessions were organized just days before the competition. The final competition happened over 2 days where teams arrived at the track in slots following the institute's covid-guidelines and were given 2 attempts each to complete the track. The competition saw an overwhelming response with the footfall of about 38 teams, around 150 highly enthusiastic on-campus students tinkering and debugging their bots. Prizes were awarded on the basis of the quickest completing time and best designs. The event was a great success and was ITC's first offline event after lockdown.



Line follower workshop

Line follower workshop was conducted in collaboration with the RoboBox community and was the first hybrid event of the club. The students were assisted in assembling the bot and making the electrical connections using a kit that was delivered to their doorstep. The kit included everything from a laser cut chassis to a motor driver to the IR sensors. The event saw 90+ enthusiastic students participating in both online and offline mode.



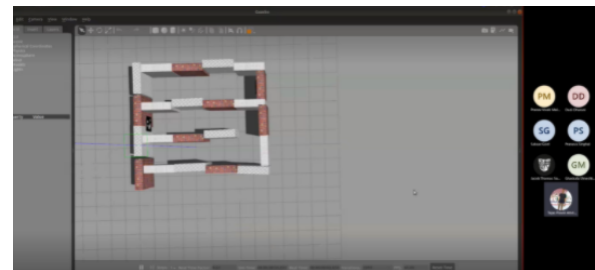
Electronics and Robotics Club

Instructors from the RoboBox community were present to explain and brief about the working of the bot, the concepts involved and to help students get started with building the bot. The session spanned around 2-3 hours followed by a super interesting quiz with the gift vouchers at the end. Each student was allotted a slot in order to interact with the instructor and to debug their doubts while building their own hardware-based bot.



fROSty Winter

fROSty Winter was a 4 week long workshop conducted on ROS and related software. This workshop was conducted in the Winter vacation, starting from 2nd December spanning four weeks. 'Sherlock Holmes' was the central theme for the workshop. In each week, the participants were provided with relevant resources in the form of a tutorial explaining the contents of the week, followed by a task to apply whatever they had learnt. The workshop covered topics including Ubuntu Setup, ROS Installation, basics of ROS, Gazebo, RViz, Turtlebot, OpenCV, ArUco markers, and basic obstacle avoidance algorithms. The resources were supplemented with frequent live sessions in which the conveners of ERC explained the content of the week and cleared doubts regarding the material or the task. Feedback was collected frequently from the participants to tune the workshop according to the progress being made. The workshop also included a few mentors outside ERC who were familiar with ROS in order to help clear any doubts regarding the contents of the workshop.



AIITRA

In the month of June an initiative was taken by the robotics club of IIT Bombay, Guwahati, Kharagpur, Kanpur, Madras and Delhi to form an organization called All IITs Robotics Association or AIITRA. It aimed to encourage robotics enthusiasts across the globe for the continuous advancement in technology and human life via new ideas, innovative solutions, and creativity in a virtual mode. AIITRA hosted its first "Robotics Workshops and Hackathon" at Pan India Level in the months of November and December. The Hackathon was a success with over 200 students participating throughout the country. It was sponsored by industry experts like Peppermint Robotics as the title sponsor offering cash prizes upto 50,000 rupees.

Electronics and Robotics Club

The hackathon which was held in 2 stages ended on 18th December with team Curious Comrades emerging as winners. ERC participated in the efforts right from the inception of the idea to the flawless execution of the hackathon. With the possibility and potential of having many events lined up in the future AITRA with the support of the founding IITs, hopes to achieve greater heights together.



e-Yantra

This year, all ERC conveners participated in the e-Yantra Robotics Competition (e-YRC) hosted by e-Yantra, IIT Bombay. Along with this ERC also increased the reach of the completion in the insti leading to more than 60 students participating in the completion.

e-Yantra Competitions teach state-of-the-art practical skills using Project-Based Learning (ONLINE) through our unique MOOCs (Massive Online Open Courses). This year's eYRC themes sensitise participants to problems of using technology in agriculture. There are 6 themes, each of which teaches futuristic skills to eventually be used to solve real problems. Each theme is targeted at teams of various levels of prior experience with particular skill sets.

More than 5 teams reached stage 2 of the competition which focuses on final theme implementation. Each team gained a lot of technical exposure in their respective technical fields. Some teams also got hardware kits to work on and implement projects in real life.

Following themes were present in the competition-

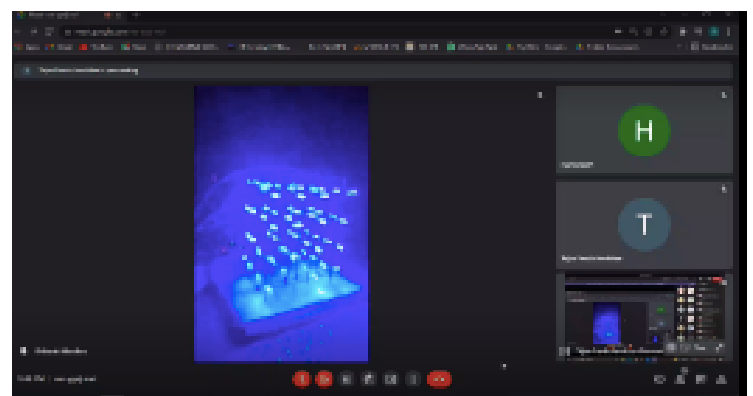
- Agrirobot
- Berryminator
- Dairy bike
- Functional weeder
- Soil Monitoring Bot
- Strawberry Stracker



Electronics and Robotics Club

ERC Freshie Orientation

One of the most important events of the year is undoubtedly the Freshie Orientation. This was an online event we conducted which had extensive participation and response from the freshers' side. With 200+ freshers attending this event turned out to be a huge success. We started by explaining the legacy of the club and what work we have indulged in the past, like XLR8 ,etc. We also brief them about the other various events like ER101 , ROS workshop ,etc. And let them know the amazing learning opportunities being associated with ERC means. From here we went to the interesting part of the night.

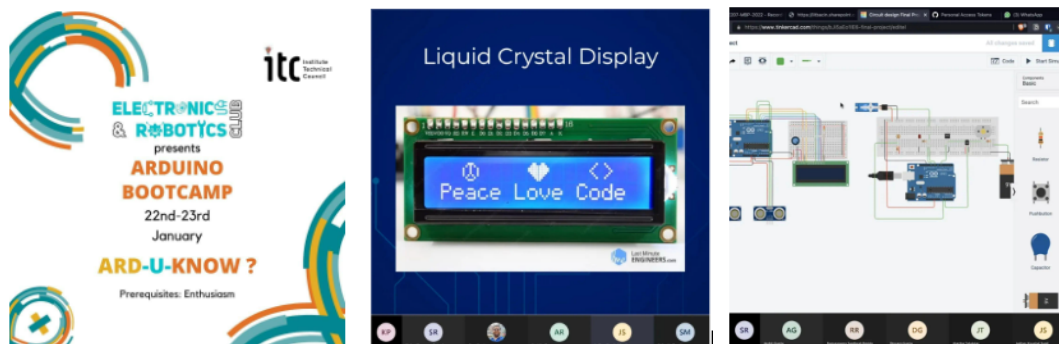


In order to truly capture the spirit for the freshies we had arranged live demos of some cool applications of robotics in a small scale. We set up a Gesture Detection robot which uses openCV to detect our hand movements and align the bot in the same direction. We talked about the theory behind this in detail, covering various things from the controller mechanism to the hardware components used. We also showed a few other hardware presentations as we wrapped off a fun afternoon. We ended the session on a high note with a fun theory quiz we prepared covering some of the broad aspects of what we have talked about. We then showed one more demo of a bot to wrap off the event. On the whole we hope that we succeeded in inspiring many freshies to actively participate in our events, and this translated later to participation in the Arduino bootcamp and further ER101 sessions.

Electronics and Robotics Club

Arduino Bootcamp

ERC started the year 2022 by conducting its flagship event “Arduino Bootcamp”, a two-day workshop which received 500+ registrations. The motivation of this event was to teach Arduino and its applications to the audience. Arduino is a microcontroller which is an essential thing to start building autonomous systems. Along with the theory regarding the components of the Arduino, small projects were integrated in the workshop for better understanding. Hands-On Breakout rooms were created from time to time for the participants to try these projects in the simulated environment of Tinkercad software.



Bootcamp saw participation from 250+ enthusiastic participants. After this Bootcamp, students were equipped with the knowledge of Arduino microcontroller and its programming, basics of Electronics, Internet Of Things, various sensors- Ultrasonic sensor, Temperature sensor, LDR along with other peripherals- Servo motors, LCD and many others.

Jhatka GC

On 6th March, ERC continued its legacy by conducting its most engaging inter hostel Jhatka GC. This was the first offline tech GC to be conducted this year and was accompanied with great enthusiasm. We had immense response from all the hostels consisting of about 70 participants in teams of 4 from all the hostels. We had a prelims round to narrow down the teams to 2 per hostel who then dueled in an intense live quiz round in which questions ranged from faster buzzer first to proper theoretical subjective questions.

Overall the questions were logical and were based on knowledge from various fields of robotics like image processing, electronic systems, Control theory, motion planning, Mechatronics, etc. The feedback was well received, with H5 taking away the first prize. COVID protocols were followed throughout the event and it was a peaceful transition into offline events, paving the way for future events also. At the end of the event we graded the answer sheets and distributed hostel GC points correspondingly.



Electronics and Robotics Club

ER 101

Seeing the success of the past edition and the positive impact it had on electronics and robotics enthusiasts, the second edition of ER 101 was organized. Revolving around a similar problem statement to the pick and place robot, several domains of robotics were explored such as mechanical design and CAD, electrical design, kinematics, etc. The sessions were conducted once every 1-2 weeks, starting from the second week of February 2022.

In the first session, participants were introduced to the problem statement and different components of a robotic arm such as couplers, actuators and motors were explained. In later sessions, aspects of mechanical design such as creating components in SolidWorks and 3D printing parts of the robotic arm were covered along with electrical design aspects such as Raspberry Pi.

The sessions saw great participation and enthusiasm from the audience with an initial attendance of 150+ participants.



Fun Theory

With the revival of offline events in the institute, ERC conducted a one-of-a-kind 'Fun Theory' session on 8th April 2022 in LH 101 and LH Foyer from 10:00 PM onwards to teach electronics and robotics related concepts in a fun way through project demonstrations and real-time tinkering.

Various projects done by the club were showcased in an exhibition like fashion, such as the theremin, propeller clock, Thor's hammer, piano stairs, gesture-controlled bot and many others. The conveners first explained how the projects worked to the interested participants after which participants got the opportunity to tinker with some of the projects, greatly enhancing the learning output. In addition, participants got the chance to freely interact with the club seniors and gain valuable insights about doing projects, experience being in the club, pursuing a career, etc. Towards the end of the event, refreshments were also provided to the participants.

The event saw great participation and enthusiasm from freshies as well as sophies, who were eager to tinker with the projects and learn as much as possible from the event.



Electronics and Robotics Club

SOCIAL MEDIA POSTS

Many people spend quite a lot of time on Social Media every day. And it is our responsibility to have them engaged with the club content on social media handles. We introduced two monthly series to achieve the same, the KnowYourRobo and the SciFlick series. We posted some memes occasionally to spread some humor.

KnowYourRobo series

We posted about one robot every month in a picture slide format where we described its specifications, applications, the technology used to build it, and some other relevant pieces of information that tech enthusiasts would find interesting. We have posted about six robots so far, each reaching nearly 1100 people on average.



SciFlick

We posted about one documentary closely related to electronics, robotics, and its applications every month in a descriptive format where we provided a brief review of the documentary, our key takeaways, the technological applications used or talked about in it, and some other relevant information. We have posted reviews on five documentaries so far, each reaching close to 1800 people on average.



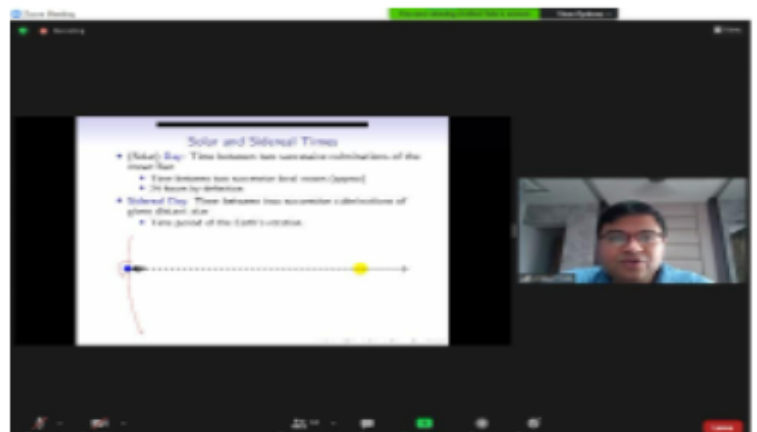
Freshie KSP

Mid July - Sept

- A 6-week long online programme aimed at providing a general introduction to Astronomy
- The first phase involved an extensive lecture series from professors and students of IITB and TIFR/HBCSE – who introduced various domains of astronomy, displayed current astronomy research in IITB and gave students a chance to apply the knowledge in interactive sessions
- The event saw over 100 registrations from IITB, and the talks of guest lecturers, which were open to enthusiasts outside IITB, and the talks of IITB Profs. saw significant participation

Prof. Aniket Sule	Introduction to General Astronomy
Aditya Kudre	Celestial Mechanics
Aneesh Bapat	Hands-on - Orbits Simulation
Prof. Anwesh Mazumdar	Introduction to Stellar Astronomy
Prathamesh Patil	Telescope Development and Handling
Prof. Varun Bhalerao	Current Research in Observational Astronomy and Space Telescopes
Prof. Vikram Rantala	Current Research in Astroparticle Physics and Stellar Astronomy
Sagar Gupta	Introduction to Grav. Waves
Prof. Archana Pai	Current Research in Grav. Waves
Dr. Vinita Navalkar	Introduction to Astrophotography and Image Processing
Advait Mehla	Hands-on - Processing a Hubble Image

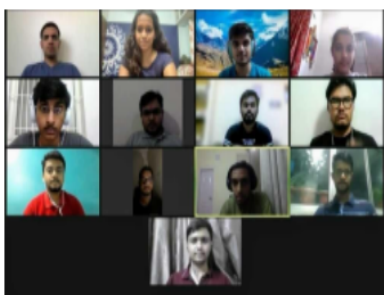
- The second phase involved four individual projects targeted at freshers based on the theory from the lecture series and python coding – taught using a collection of Jupyter notebooks
- The four problem statements were on Stellar Aberration, HR diagrams, Hubble's law and The Lane Emden Equation
- The participants were provided with relevant astronomy and coding related resources and were mentored by conveners and seniors of the club
- This phase lasted a month and received completed submissions from 12 participants who were awarded certificates



KSP 2.0

July – Sept

- KSP 2.0 comprised 3 projects that explored various aspects of astronomy and astrophysics through the means of theory, advanced data analysis, and animations with Python
- The projects were open to anyone from any institute, except for IITB freshers
- Astronomy-enthusiast students of varying levels of expertise from multiple nations participated and made KSP a grand success. The event saw over 100 applications and selected the top 24 for the projects
- The project reports of each team will be available on our official website



Eclipsing Binaries:

The project involved gaining an understanding of the two-body problem and light-curves and types of binary stars, creating a simulation of binary stars in different configurations using the python package PHOEBE and analysis of QX Cas, an eclipsing binary system in the constellation of Cassiopeia

Photometry and Supernovae:

The project involved studying the physics and mechanism of supernovae explosions, calculating zero point correction using Aperture Photometry Tool, creating light-curves of a supernova and studying its properties using astronomy libraries in Python such as PSFex and Source Extractor.

Simulating Kirkwood Gaps:

The project involved studying the energy distributions of many-body systems using various integrators such as Euler, Verlet, Runge-Kutta 4 and symplectic Euler, creating simulations of asteroids of different types in various Lagrange points with time periods ranging from 10,000 to 380,000 years

Astronomy based word games and quizzes

23rd Oct

An online event open for all – organised by Krittika in collaboration with Literati Club

A fun evening of astronomy based word games and quizzes including rebuses (guessing words using pictorial hints) and XYZs (guessing words which have a set of 3 common letters)

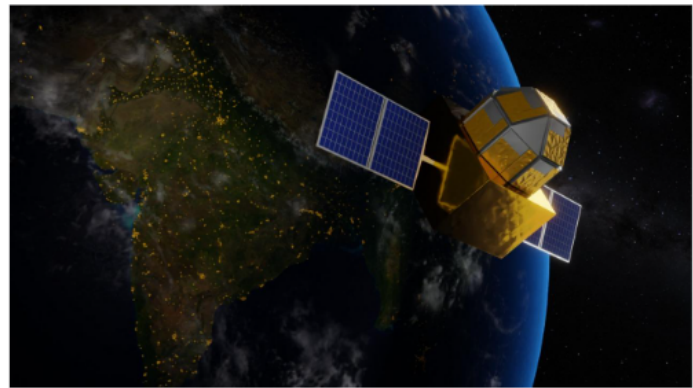
Involved an astronomy quiz section, named Astrotrivia, including interesting questions based on famous sci-fi movies such as Gravity, Interstellar, Martian etc. and questions covering historically important astronomy events

Social media publicity of the event was done by both clubs together, involving a fun quiz based on the personalities and lives of famous astronomers & a brief overview of their work



Team ANYmation

- Created an accurate 3D model of the Daksha Satellite: a proposed space mission for detecting high-energy counterparts to gravitational wave sources; led by IITB
- Created astrophysically accurate renders of the solar system, earth and evolution of a star
- Rendered an accurate view of the night sky as seen from the earth (inspired by the popular software: Stellarium)
- Conducted two rounds of recruitments over the past year, recruiting 20+ students from B.Tech., M.Tech., B.Des. and M.Des. programmes of IITB into the team



Astro GC

12th – 19th Mar

- Industrial Technical Challenge organised by Krittika in collaboration with Nayam Innovations. It was organised as a Mid Prep GC
- Problem statement provided by Nayam Innovations on optics – to be solved computationally on Python over a week individually or in teams of two
- The GC saw about 20 submissions crossing the participation threshold from individuals and teams from various hostels
- The winner will be awarded a cash award of ₹25,000, along with an opportunity to get a paid intern at Nayam Innovations

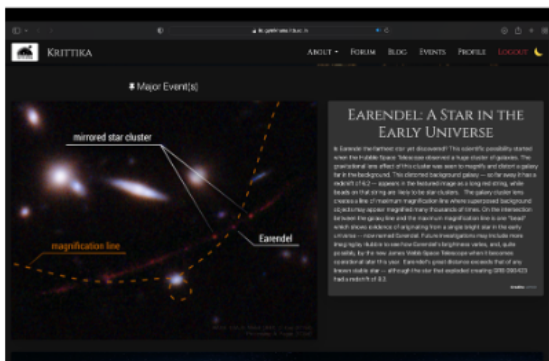
Reading Clubs

19th Dec, 19th Mar

- Organised two reading clubs where a small group of astronomy enthusiastic people (with some basic prerequisites) have an informative discussion on papers and articles relevant to a pre-decided topic
- The first reading club, hosted by Mr. Sagar Gupta, involved a discussion of the production of gravitational waves through a general relativistic picture. This was followed by discussing the effects of gravitational waves on space-time and how we can detect these tiny effects. Finally, their detection methods using libraries such as PyCBC and cWB were discussed
- The second reading club, hosted by Mr. Yash Bhargava, involved a discussion of the study of X-ray emissions from astrophysical objects and some aspects of the Indian satellite AstroSat. Mr. Bhargava also described some of the interesting studies he has done on various X-ray binaries in our galaxy

Stargazing

- Organised stargazing sessions for on-campus students and faculty
- Involved hands-on experience with Dobsonian telescope, equatorial telescopes, DSLR with tripod for long exposure, and binoculars. Targets such as Geminid Meteor shower, Orion Nebula, Jupiter, Saturn, Moon etc were observed
- Events were organised on request for faculty and in collaboration with hostel fests of H2, H3, H6 and H9 in hostels and various other locations
- Attendees were given an introduction to the targets they viewed, including science, interesting facts and mythology

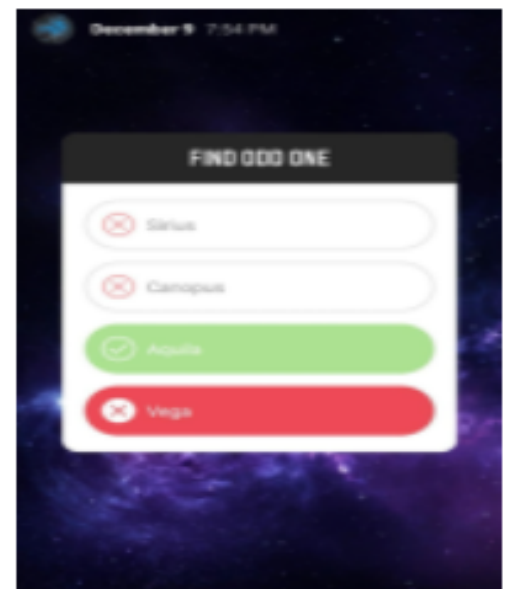


Inventory Updates

- Purchased iOptron CEM26 GoTo mount – opening the door for long exposure astrophotography with club equipment
- Launched club website and ported it from herokuapp to Gymkhana servers
- Created an exhaustive list of the club inventory along with the updated status of all items after being left unattended during lockdown

Social Media

- Increased Instagram reach up to 1400+ followers
- Content is posted 3-4 times a week, either through stories or posts
- Posts include Messier Mondays (Informative content about different messier objects, complete with a star map), historically significant events as well as recent celestial phenomena and news, interesting astronomy-based memes and general trivia.
- A variety of interactive games are posted through stories such as jumbled words, fill in the blanks, myth/truth, this/that and winners get featured in the next story. A brief explanation of the corresponding objects/events is also posted in the answers.



The Maths and Physics Club (MnP)

Summer of Science (SoS)

Summer, 2021

Summer of Science is an initiative started by the Maths and Physics Club with a handful of participants in 2016. It is a one-to-one mentoring program, where we match enthusiasts who aspire to learn about a topic and are matched with student mentors with sufficient experience in the field. The topics ranged from Computer architecture, Chemical Kinetics, and Cosmology to Robotics, Aerodynamics, and even Abstract algebra. The participants were encouraged to submit a report of their learning at the end of the summer - the reports will be put up on the club website.

With over 600 mentees and 200+ mentors, Summer of Science 2021 was successfully launched on 12th May, continuing its rapid expansion since it began six years ago. This time in addition to reports, all participants were asked for 10-minute presentations expanding a particular subset of their SoS and we are glad to report that we received 360 completions compared to 340 last year in total. Certificates were awarded to participants who submitted reports and presentations.

Event Description - <http://mnp-club.github.io/blog/summer-of-science/>



Winter of Puzzles (WoP)

Winter 2021-22

A new initiative started this tenure, Winter of Puzzles offers projects that are based on research-level problems that can be studied as puzzles. The fields covered are broadly taken from mathematics, logic, and computer science, and the projects are guided by mentors who have experience in the related fields. The topics offered in this maiden iteration of WoP are Coding theory, Combinatorics, Cryptography, Data structures & Algorithms, Differential Topology, Logic, Representation theory of finite groups. The event had 200+ registrations and after the mentors selected students as per their respective selection criteria, we offered 139 students projects in the listed fields. The event is still ongoing but we are monitoring the progress of each topic separately to ensure as many completions as possible by the end of the winter break.



The Maths and Physics Club (MnP)

Bazinga!

26th and 27th December, 2021

One of the most awaited flagship events of the Maths and Physics club is our annual quizzing competition Bazinga!. Held over two days, one day dedicated to each of Maths and Physics, the participants faced challenging conceptual questions in Maths and Physics made to pique their curiosity.

During Physics Bazinga! 90+ participants unleashed their inner scientist and attempted to explain some interesting and bizarre phenomena using simple (even high school) concepts in the brief thought and video rounds and find flaws in paradoxical statements. The Maths Bazinga! also saw enthusiastic participation of 90+ students, who tried to solve mind-boggling problems while racing against the clock in the challenge rounds and a game round involving sudokus and Conway's game of life.

Both the Bazingas were held in a similar format, with a preliminary round followed by 3 interactive rounds including a round based on physics paradoxes, and a game theory based round, where 4 finalist teams, each comprising 4 members, battled it out for the crown. The judges for the subjective rounds included senior students and alumni.

Link for Bazinga! Math question paper:

<https://bit.ly/BazingaMath2021QnA>

Link for Bazinga Physics question paper:

<https://bit.ly/BazingaPhysics2021QnA>



Mathathon

21st-23rd August 2021

Mathathon is the annual maths quizzing event of MnP. It was conducted in 4 exciting and mind-boggling elimination rounds this year, the first one being Objective (Olympiad Level), while the successive rounds were subjective with increasing levels of difficulty. The event was open for all maths enthusiasts across the nation and received very encouraging participation - 750+ students across top universities in the country invested some time to try and crack the well-formulated questions! Certificates were awarded to all participants who cleared the first round and to the top 15 winners after the fourth round.

Mathathon questions & solutions:

<https://bit.ly/Mathathon2021QuestionPapers>

<https://bit.ly/Mathathon2021Solutions>

The Maths and Physics Club (MnP)

Integration Bee

3rd April, 2022

Inspired by the famous competition of the same name held by MIT annually, and an event many in our community were looking forward to, we held the Integration Bee on 3rd April offline. With a total audience of 50+ students, the event started with a preliminary elimination followed by elimination rounds till a semifinals round and a final match. The tension in the LA was quite palpable by the semifinals as the very enthusiastic audience cheered support for the participants and were discussing the integrals amongst each other.



SciComp Blitz GC

14th-16th October 2021

We held the General Championship SciComp Blitz and was held in collaboration with Quriosity, an app developed by Aakash (final year EP student) where we provided a primer for the topics involved in the competition. Some of the topics explored included discrete Laplace transforms, Euler's method, and other topics applied to physics problems. The competition was held on Hackerrank and participants participated in teams of 1 to 3 people and as per the recent change in Tech GC guidelines, these teams were permitted to be mixed. A total of 101 teams registered in the event and the final rankings can be found here.

SciComp Blitz GC questions & solutions: <https://bit.ly/SciComp-Sols>



Talks

Exemplary "lane-discipline" in the nanoscale freeways inside emerging nanoelectronic devices

23rd March 2022

For the very first offline talk we held in nearly 2 years, we invited distinguished Prof. Bhaskaran Muralidharan of EE department IIT Bombay for giving a talk. The talk explored various topics which are the frontiers of current nanoelectronic device research including Prof. Bhaskaran's own research. The talk had participation of 15 students

Abstract of talk: <https://tinyurl.com/37f8343z>



The Maths and Physics Club (MnP)

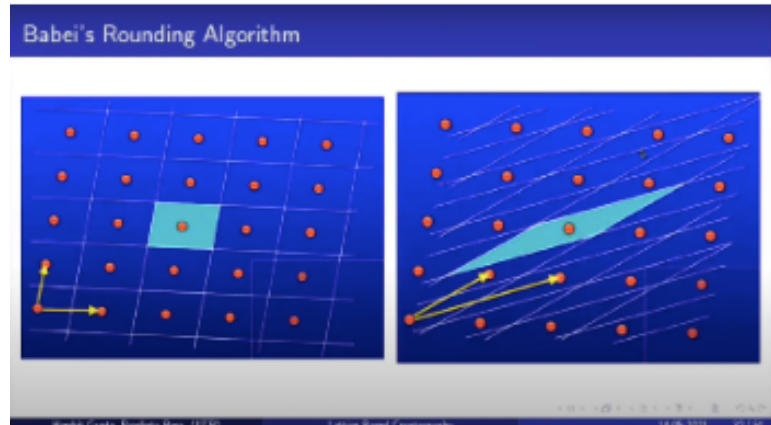
Lattice Cryptography

14th June 2021

In this intriguing talk, given by Pradipta Bora, a 3rd-year undergraduate pursuing a B.Tech in Computer Science, we learned about the basic properties of lattices and how to exploit these to create lattice-based methods of encryption. The talk had the participation of 30 students.

Link to the recording of this talk:
<https://youtu.be/pVqDUh9m34>

Theoretical Cryptography Course:
<https://tinyurl.com/57wupzdy>



The Purcell Effect

7th July 2021

In this talk, Aneesh Bapat, a third-year undergraduate from the Engineering Physics department enlightened us about the Purcell effect i.e. the enhancement of a quantum system's spontaneous emission rate by its environment. The Purcell effect can be useful for modeling single-photon sources for quantum cryptography. We received the participation of 20 students.

Link to the recording of the talk: <https://youtu.be/bok9Vyi26Tk>.

Slides can be found here: <https://tinyurl.com/bdhbbchj>



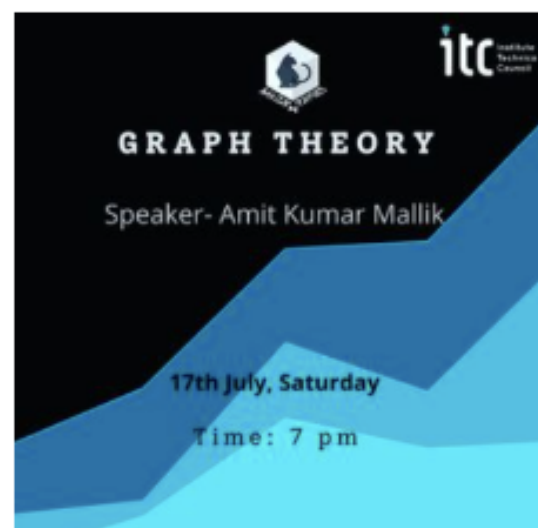
Graph Theory

17th July 2021

This talk by Amit Kumar Mallik, a third-year undergraduate pursuing a Btech in Computer Science was insightful for instizens to get an idea on the basics and origins of graph theory and its unsurmountable applications from finding shortest routes for google maps to designing circuit connections in electrical engineering. We received the participation of over 25 students.

Here is a link to the recording of this talk:
<https://youtu.be/Ja7ojBldHMg>

Link to slides for the talk: <https://tinyurl.com/bdfmdmnc>



The Maths and Physics Club (MnP)

Group Discussions

Minds vs. Machines

5th February 2022

How does one draw a line between an “intelligent” machine and a human? On 5th Feb, we held a group discussion exploring this topic which had a participation of 30+ students. Delving into the philosophy of what makes us classify an entity as conscious and the theory behind the Turing test, we explored the fine lines between those of machines and humans



Quantum Pseudo Telepathy

18th August 2021



Quantum pseudo telepathy was an interactive group discussion with a participation of over 20 students. In this GD, we covered the conflict of the locality and realism of quantum mechanics and got hands-on into the basics of quantum information. We then discussed how on the introduction of quantum entanglement in game theory problems, we were able to make good experimental checks for realism and locality of quantum mechanics. The event proved to build up convoluted concepts from the ground up leaving very little to prerequisites.

Link to a recording of the group discussion:

<https://youtu.be/Y1V4SOpArYw>

Link for slides of the talk: <https://tinyurl.com/mrtjdkfv>

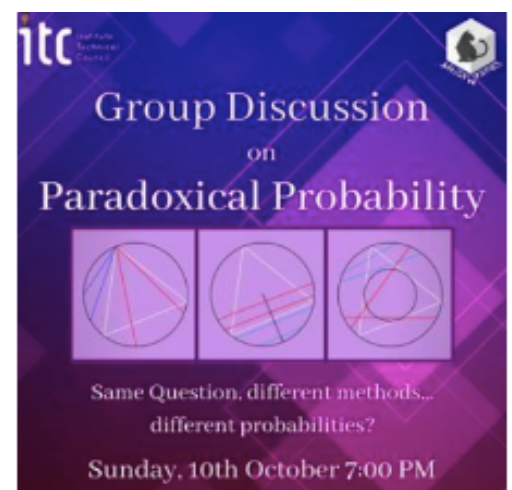
Paradoxical Probability

10th October 2021

This GD kept us on our toes. Paradoxical Probability was a talk on the trickery hiding behind probability in plain sight. From the first time we hear the word ‘fair die’, probability has begun to trick us. This talk delves into more seemingly straightforward concepts that leave the mind boggled. It talks about a more advanced version of the Monty Hall problem, sleeping beauty, rain in Seattle and plays with conditional probability. The group discussion had active participation from 23 students.

Link to the recording for the group discussion:

<https://youtu.be/FRhODHbQR2Q>



The Maths and Physics Club (MnP)

Trivia Time

3rd July 2021

The Trivia Time quiz was a short and fun event aimed to bring back the adrenaline rush of learning and bring to light all the strange science, math, and facts about scientists that we know. Ranging from scientific and mathematical concepts to the quirks of scientists and scientific history, the questions provided a lot of insight into the world of scientific trivia. The event saw the participation of over 25 students.

Miscellaneous

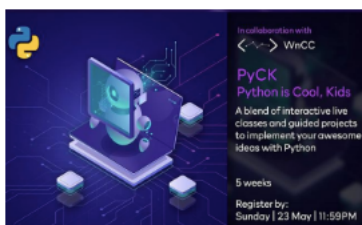
- We revamped our website and revived the website blog. Some of our social media initiatives include Brain Busters, #CKTCBSBIB, and various Instagram quizzes.
- Brain Busters: we posted stimulating logic-based questions once every month and featured the first solvers on our pages.
- #CKTCBSBIB: (which stands for “Curiosity killed the cat, but satisfaction brought it back”) Here, we post a write-up on interesting maths and physics topics, along with articles for further reading.
- Along with that, we post small trivia questions on our social media stories, to keep the audience engaged.
- As a prelude to our Winter of Puzzles (WoP) event, we created a puzzles community. We received active participation of 200+ students for whom we would post 2 interesting problem statements per week, on a particular topic. The puzzles were discussed enthusiastically by members of the puzzles community.



Seasons of Code: Summer (2021)

In the 6th edition of SoC, we witnessed our highest ever participation count. We received an overwhelming 50+ projects mentored by 80+ senior students. This year we had projects in a multitude of domains, ranging from Web and App Development to Machine, Deep, and Reinforcement Learning to miscellaneous projects on Quantum Computing, Image Rendering, etc.

A total of 330 students were selected for these projects, out of which 200+ applicants were successfully able to complete their projects.



PyCK: Python is Cool Kids!

WnCC, in collaboration with a group of enthusiastic seniors, introduced a 5-week workshop to acquaint beginners with the usage and advantages of python. At the end of the workshop, the students applied their skills to work on application-based projects. Participants were also awarded certificates.

Software Internship Preparation Program

Panel Discussion

WnCC collaborated with the Career Cell of IIT Bombay to conduct an informative panel session on internships in the IT and software profiles.

The panelists for the session were-

- Aakash Kapoor - ML researcher at Samsung
- Aayush Kadam - Interned at Google
- Akkapaka Saikaran - Interned at Microsoft (ML)
- Sabyasachi Nayak - Interned at Honeywell
- Tarush Goyal - Interned at DE Shaw

The session received an overwhelming response with registration from 700+ students and 400+ participants who actively joined the session.



DSA Learning Series

4 DSA preparation booklets (comprising both theory and questions) were released to help students prepare for internships.

Aakash Kapoor, a Machine Learning researcher at Samsung, took the DSA tech sessions for assistance with the content given in the booklets. In the last two sessions, students discussed previous year's Intern questions related to DSA.

Polygon Blockchain Developers Meet

WnCC, in collaboration with Polygon, conducted a Blockchain Developers meet in which the speakers were Muskan Kalra (Lead Developer at Polygon) and Vinayak Kalra (Founder of QuadbTech). More than 150 students attended this event, and the attendees were given certificates.



Website Revamp

We revamped and rejuvenated our website in September. The UI was completely redesigned with much more soothing colors and amazing animations. Thus, making the website much more interactive and user-friendly.

Discord Server Launch

WnCC launched its brand new Discord server to serve as the official means of communication. The server includes channels for club events, competitions announcements, WnCC posts like the newsletter and In Case You Didn't Know series, interest-specific channels like Dev Discussions and CP@IITB. The server is growing rapidly and currently hosts 1200+ members.

Hello-FOSS

Continuing last year, WnCC conducted a coding festival, Hello-FOSS, in October. It was meant to uphold the spirit of Hacktoberfest and encourage and instill the culture of Open Source software development in the institute.

This year we tried to improve the variety of projects and they were based on social good, life in insti, and learning themes. Conveners conducted a brief session before the launch of each of the projects to give the students an overview of each project and the resources to begin contributing.

A separate website was also created to disseminate all Hello Foss-related information. Overall the participation was pretty good, with projects like Intro to ML and Contributive Programming getting 70+ PRs.



A brief overview of the projects:

- Bash for Good
- Contributive Programming
- Intro To ML
- LifeAudit
- d(AI)gnose
- Smart Laundry

UI/UX Design

WnCC, in collaboration with Design Club, conducted a workshop on UI/UX Design, which is a very integral part of App and Web Development. With over 6+ years of experience, Prathamesh focuses on creating meaningful experiences through design. He Works for 45+ stakeholders' experiences from different industries for B2B and B2C digital products. The event was a success, and 200+ students participated.



CodeGames v3

After a successful CodeGames V1 and V2 contest, we organized a new competitive coding competition. As a twist, we twiddled the problem statements into solving the issues of your favorite characters from various web series(s).

We saw a registration of 300+ students and more than 900 total submissions. The top 3 participants were also awarded exciting prizes worth Rs 3000.

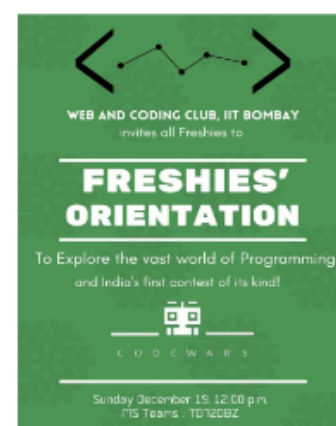


Freshie Orientation

WnCC successfully conducted the freshie orientation online with 350+ participants.

We demonstrated the true power of programming and how programming enhances every aspect of your day-to-day life.

We also taught about the various programming domains and some of the most important tools anyone would use as a Programmer.

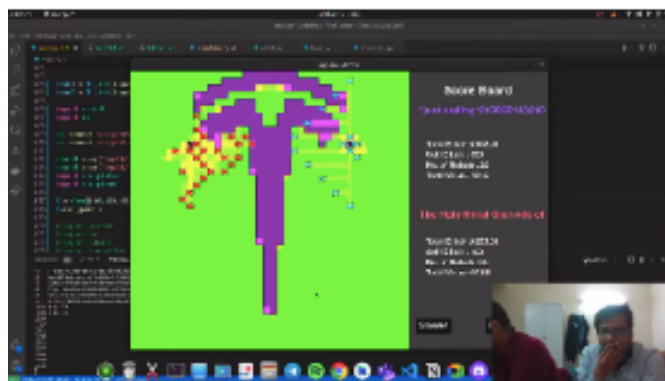


Code::Blogs

We started the Code::Blogs section on the official website of WnCC, which consists of some amazing articles written by the seniors of IIT Bombay. They share their coding or tech-related experiences across various competitions or events. Blogs involving experiences in ICPC and Microsoft Engage were uploaded.

CodeWars v1

India's first bot-programming contest, CodeWars v1, successfully managed to replace Scratch Day as our flagship event for Freshers. Though many freshers found it tough at first, through mentors and generalized helping sessions, people who could not install Python successfully wrote an AI bot for the game. It turned out as a great first Introduction to Programming, where they built bots on Python to play the game of Virus and Elixir. Participants were given over 15 days to learn and code their bots.



The event culminated with a showdown on YouTube Live, where the bots of the top 16 teams competed against each other for the win. Our attempt to simulate MIT's BattleCode turned out to be a success.

Some key features of the event were:

- Among the Top 3 most-watched Video on our YouTube Channel
- 450+ registrations, 270+ submissions
- ~100 T-Shirts distributed for the same
- Largest Online ITC Event



Coding GC

As a part of the Tech GC, Wncc had conducted the Annual CP GC on CodeForces where 50+ number of students had taken part, and the first prize was bagged by Hostel 9, followed by Hostel 2 and Hostel 3. The participants had an exciting time participating in this, as the problems were also challenging.

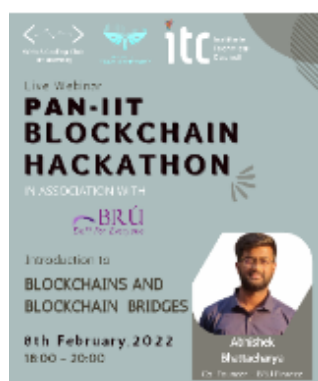
Game Development Hackathon 2022

WnCC with DevCom conducted a beginner-friendly hackathon where we encouraged everyone to participate and build innovative games irrespective of their experience in the field. Participants were expected to deliver an innovative game developed using HTML, CSS, and Javascript as a final submission. We received a bumper registration of 135+ teams, and 50+ completed the hackathon! Ten Freshie winner teams were given a direct chance to interview for the position of Core Team Member at Developers' Community!!



InstiWiki

On 2nd February 2022, we proudly launched Instiwiki - a one-stop solution to know everything about your beloved Insti. The website contains relevant information about various councils, clubs, and most of the activities in our institute. You can check it out at <https://instiwiki.gymkhana.iitb.ac.in/>. InstiWiki is envisioned to be a one-stop Wiki for the whole institute. It holds vast potential. We are still far from the goal but have made an excellent start.



PAN IIT Blockchain Hackathon

As part of the Inter IIT Tech Symphony, WnCC collaborated with Bru Finance (a Blockchain-based DeFi startup) to conduct a Pan-IIT Blockchain Hackathon. The hackathon witnessed participation from 15 IITs and registration from over 300 teams. An introductory briefing session on 'Blockchains and Blockchain Bridges' was also conducted by Bru Finance's co-founder Mr. Abhishek Bhattacharya.

CodeWars v2

After witnessing a great response to CodeWars V1, WnCC planned to organize CodeWars V2 in offline mode after two years. CodeWars V2 was based on the hot domain of Algorithmic Trading. WnCC conveners worked on a game engine that tried to simulate a real market where people could buy or sell securities to maximize their net worth by earning profits in the market. People were to participate in teams of three, and the team with a maximum net worth won the contest. This event involved two hours of an intense coding period where people had to implement their trading strategies in python. The event witnessed participation in huge numbers, and the entire LA 202 was brimming with participants. All the participants remained hooked on their seats till the end of the contest.



InstiWiki [\[edit \]](#) [\[edit source \]](#)

Anything and everything about our beloved Insti

Insti Wiki is envisioned to be a one-stop Wiki for the whole institute. It is a work in progress, and will always be. Thanks everyone. Curious what more InstiWiki offers? Check out this article - U

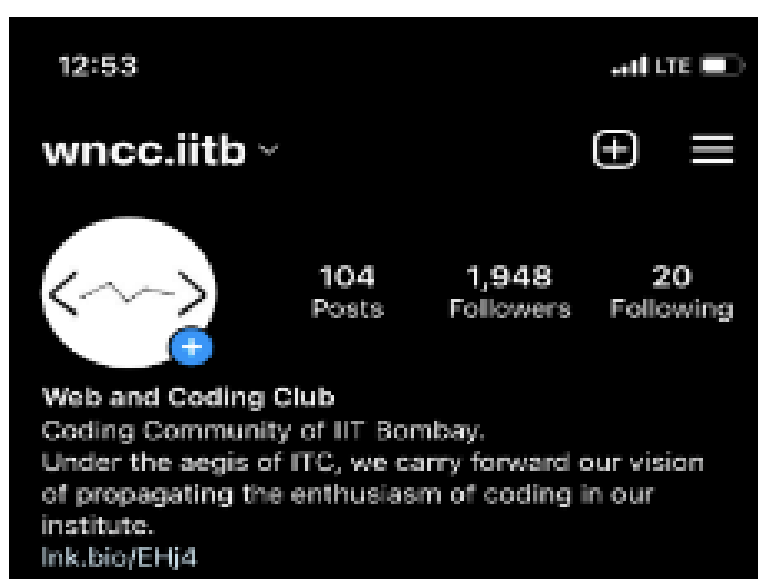
- Checkout the Pages of each council here :
 - [Institute Technical Council](#)
 - [Undergraduate Academic Council](#)
 - [Institute Sports Council](#)
 - [Institute Cultural Council](#)
 - [Hostel Affairs](#)

Social Media and Outreach

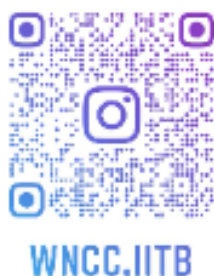
All the events, updates, and upcoming competitions conducted by the club were communicated through Instagram and Facebook posts. WnCC also continued In Case You Didn't Know posts, consisting of information about an interesting topic related to programming in general, e.g., Servers, NLP, Encryption, etc. Total 4 ICYDK posts were put up, among all the ~50 posts consisting of events and updates throughout the tenure.

WnCC's YouTube channel also witnessed a spike in the total number of views, and the number of subscribers also doubled. Several sessions, such as Intern Prep Talk, Introduction to Open Source, and CodeWars v1 contest, were live-streamed on YouTube during the online part of the tenure.

WnCC's weekly newsletter, which serves as a bridge between WnCC alums and the club, was also redesigned during this tenure.



Instagram -



Facebook - <https://www.facebook.com/wncc.iitb/>

Discord - <https://discord.com/invite/fHUH46xyGD>

LinkedIn - <https://www.linkedin.com/company/wncc-iitb/mycompany/>

Website - <https://wncc-iitb.org/>

YouTube - https://www.youtube.com/channel/UCs3x_XxwSciAzDUfN1IbbGw

WnCC Google Group - https://groups.google.com/g/wncc_iitb

Link in Insta Bio - <https://lnk.bio/EHj4>

Tinkerers' Laboratory

OVERALL SUMMARY

Over the last eight years, Tinkerers' Lab has emerged as a fundamental hub for all student-led technical activities. The 300+ on-campus students using the lab itself define the sizeable and steady growth of the lab even in the COVID-19 time, with approximately 8k+ student beneficiaries, including undergrads, postgrads, doctorate students, using the lab to date.

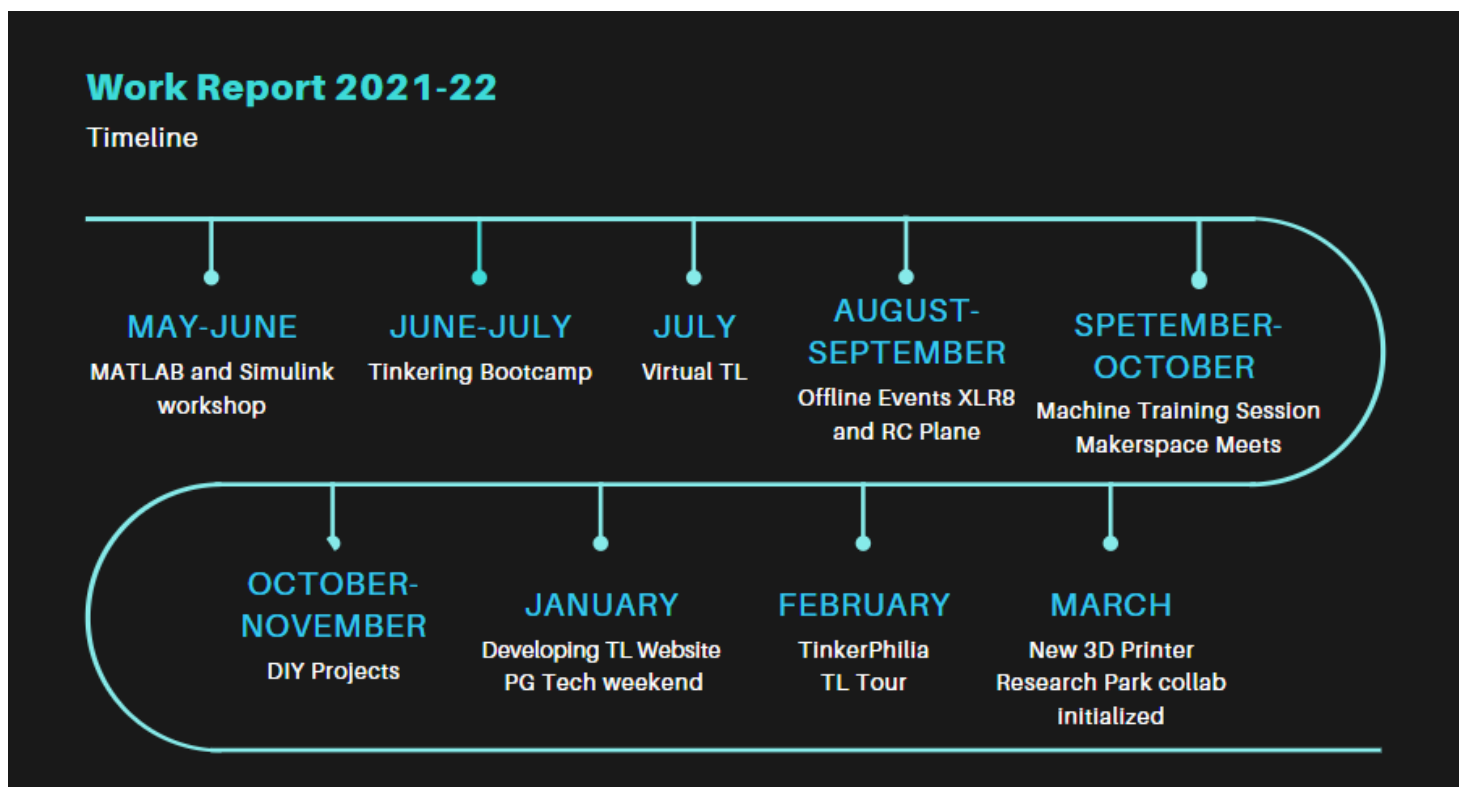
The lab's management structure continues to be student-driven, and the student council has been in place a system for a smooth transition of control to successive batches of students.

The space for the lab has also doubled from 700 to 1500 sq. ft and in the future will go up to 5000 sq. ft. when the lab shifts into the upcoming academic Maker Space at the Desai Sethi Centre for Entrepreneurship.

This is a tinkering facility at IITB where students can come 24x7 to pursue their interest in tech and work on their projects. We are grateful for the continuous support of the class of 1975 and 1966. The final trench of money from C'66, Maker Bhavan Foundation was transferred to TL in 2019. Five successful start-ups have emerged from TL in the past 8+ years.

EVENTS OUTLINE

A brief outline of events conducted by TL in 2021-22 tenure



Tinkerers' Laboratory

PARTICIPATION STATISTICS: EVENTS AND PROGRAMS

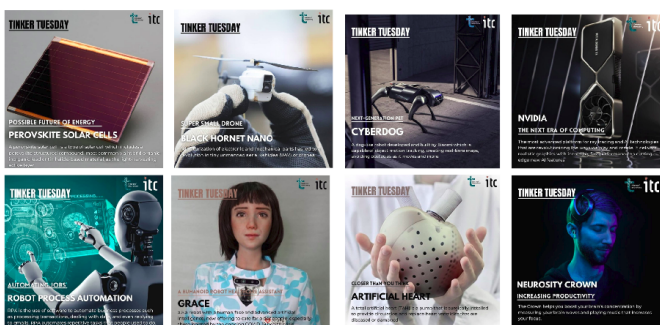
- How Things Work Online Competition: Sixteen 3-5 minutes long video entries were shared over several social media platforms.
- DIY Projects: 40+ projects centered around home automation, theft detection, automatic door lock, GPS tracker, disco lighting with music beats, people count in a room, etc., were built.
- MATLAB and Simulink Workshops: Basics workshop on MATLAB saw 250+ attendees, and 150+ of them completed MATLAB Onramp and received the completion certificate from MathWorks.
- Tinkering Bootcamp: We received a fantastic response with the participation of over 150 students and great reviews.
- Virtual-TL Discord Server: This server is the online counterpart of TL, aimed at helping students by answering doubts and providing resources with over 500 members.
- XLR8 in collaboration with ERC: Successfully conducted XLR8 for 130+ on-campus students
- Machine Training Session- More than 180 Students were educated about the working of TL machinery like 3D Printers, Laser Cutter, Electrical Workbench, Power tools, etc.
- TinkerPhilia saw a participation of over 100 freshers where the winners were awarded Arduinos.
- TL tour was organized for the freshers with a participation of 35+ out of the 80 that were on campus.

VIRTUAL TL

Created and set up the E- Tinkerer's Laboratory Discord Server. This server has been organized into different sections, each serving different purposes, such as a section where enthusiastic students can discuss some new technology or a section where students can post their doubts and difficulties in using some equipment and get them resolved. Announcement and doubt forums for the courses under Learner's Space were also created and used to convey critical information regarding the sessions. These forums were also used to help the students enrolled in the courses with any doubts related to the content, assignment, etc.



TINKER TUESDAY

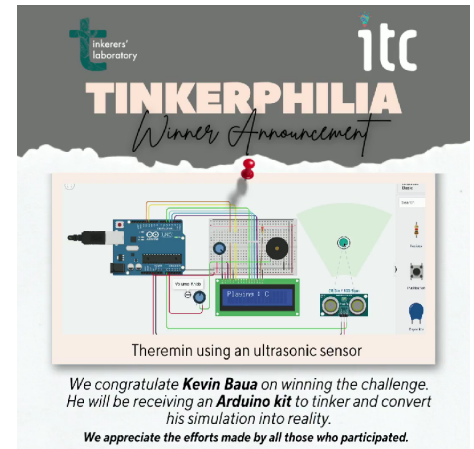


Our Social Media pages witnessed weekly posts every Tuesday, giving insights on new advancements in the field technology and keeping the TL community updated with such advancements. Around 30 such posts were posted.

Tinkerers' Laboratory

TINKERPHILIA

- TinkerPhilia was conducted as an orientation of the for the newly joined freshers batch. The event aimed at rejuvenating the tech enthusiast within the freshers through an online visit of the lab followed by a small IoT demonstration where students could interact with an LED kept in the lab form their homes and they were given a small task to be completed by them on a simulator website. Breakout rooms were arranged to help them with any difficulties that they may face during the simulation . The winners were awarded with Arduino kits to convert their simulated ideas into reality.



TL TOUR



A tour was organised for the freshers batch on campus to make them aware about the functioning of the lab. The tour included intro to the various machines, with major emphasis on the laser cutting machine, followed by a short video screening and project demonstrations. The students were then given Laser cut keychains as mementos. The students were divided in small groups and masks were ensured to abide by the COVID Rules.

DIY PROJECTS

Tinkerers' Laboratory put forward a program to encourage project development right at the students' homes. These projects were focused on different ways to optimize our homes to make lives more convenient and secure. They were designed to require minimal hardware resources and coding. It was targeted to beginners and students who wanted to gain experience working with low-cost hardware like basic electronics, Arduinos and ESPs. DIY concluded with 40+ final submission of different projects.



ALUMNI VISITS

Over the year, we had organized 3 alumni visits to have around 10 alumni visiting TL on various occasions to guide students on how to rebuild the whole hardware tech culture. We showcased the projects we completed over the pandemic and the offline ones and discussed ideas on how to implement this further.

Tinkerers' Laboratory

OFFLINE EVENTS

We collaborated with various hobby clubs to conduct offline events for reviving the insti tech culture. In the process, we ensured the lab was utilized in its total capacity along with following covid protocols. We saw the participation of 400+ students in total for all offline events and followed the rules for such a massive crowd by dividing them into groups and making a proper timeline.



MAKERSPACE

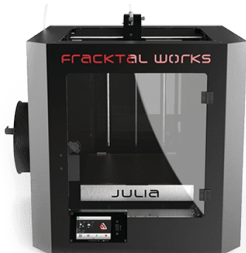
After the successful completion of Tinkering Bootcamp over 2 years, we are helping the academic body to properly structurize this course for the 1st year, including the formation of proper labs with useful equipment and machines, making of course structure and contents to deliver along with projects and demos to be done and finalizing the timeline.

MACHINE TRAINING SESSIONS

This Session was organized in TL with the aim to familiarize students with different machines and facilities in TL. Students were educated about the operations of TL machinery including Laser Cutter, 3D Printer, Power Tools, Electrical workbench, etc over a span of 4 days. For better understanding, live demos were conducted where students were encouraged to try using machines on their own. More than 180 Students joined the session and feedback collected reflected more such sessions should be organized.



NEW 3D PRINTER



A new 3D printer was bought by TL in April 2022 to cater to the sky-high demand of 3D printers in the institute. The new 3D printer is "Fracktal Julia Extended" with a bed size of 250mm x 250mm, working on the FFF Printing technology. The machine was bought to distribute the load between multiple machines and reduce the waiting time of the students

Tinkerers' Laboratory

COLLABORATION WITH RESEARCH PARK

Research Park is envisioned to be an innovation hub through industry-academia collaboration and enabling a two-way flow of knowledge and resources it also aims to boost technology readiness levels of projects undertaken within the institute. At the core of its aims lies the need for industries to establish student contact and facilitate learning. Tinkerers' Laboratory, over several rounds of communication has been working towards harnessing the potential for cross-platform project creation and development, financial endowment, in-semester internships and sponsored workshops. We hope to achieve industry-level interaction and bring in external exposure to the lab, thus helping us broaden our horizons in terms of real-world critical thinking.



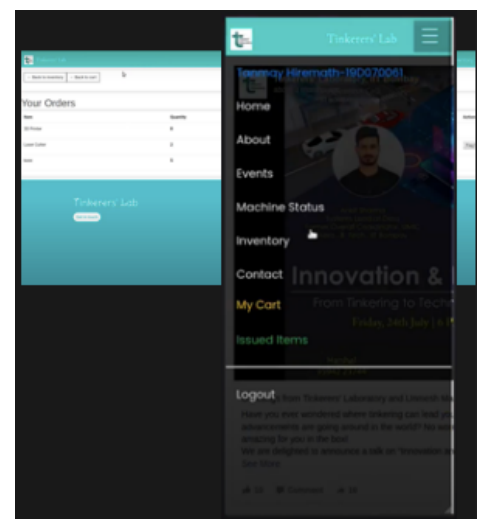
FLIPKART GRID CHALLENGE



Team RoboSapiens(IIT Bombay) participated in Flipkart Grid 3.0, Flipkart's flagship engineering campus challenge. For Round 1 elimination, the team worked for 4 months on a problem statement of parcel delivery to four different locations by logistics robots, algorithms were developed to automate the task with help of PID, and IoT was used for helping bots to send instructions to each other and raise flags. Computer vision technology was used with a camera setup on the ceiling to get the positions and velocity of each bot at every instant inside the grid.

REVAMPING THE TL WEBSITE

- To solve the problems of inefficiencies in record making of issued items and their retrieval, a full-fledged inventory system was built that records students' personal data including email and phone numbers for ease of contact, and it registers all the items present in the lab by classifying them as consumables, issuable or heavy equipment (non-issuable).
- A student uses the system very simply, just like an e-cart service.
- The website also showcases usage activity of the equipment in the lab like 3D printers, laser cutters and the milling machine.



Tinkerers' Laboratory

SOCIALS



- <https://www.facebook.com/tinkererIITB>



- <https://www.instagram.com/tinkererslab.iitb>



- <https://linktr.ee/tinkererslab.IITB>



- <https://www.youtube.com/channel/UCUGFs4z7PUXwp9uNCv4RHvw/featured>



- <https://discord.com/invite/2dHraAQcW8>



OVERVIEW

Following our appointment in late June, the student team embarked to quickly gauge the interest in the makers' space and get feedback and suggestions from the students to set up a vision for the Lab.

We then took the help of professors to decide the areas that the Lab should focus on, and Industry 4.0 & Microfluidics were the ones chosen initially. Furthermore, due to the unique target group of ChemE TL compared to other clubs, we came up with the idea of yearly themes. After discussing this with the sponsors from Alkyl Amines, we started to decide on the equipment needed for the Lab and get started with the renovation of the space allocated for the Lab.

The final deliberation on the specifics took longer than expected, especially with the furniture required for the Lab. In the tender, we focused on getting the essential equipment for tinkering. The Phase-1 equipment has been delivered to us, and we are installing it currently.

We expect to complete the installation and testing before the end semester exams start. We also plan to collaborate with other labs for more specific needs such as spin coating, nanotechnology, etc. We also worked to develop our publicity campaign side-by-side, ideate new events, and develop some of the core aspects that would propel the lab in the years to come.

VISION

We aim to make ChemE TL a place where people from all disciplines can come together and work on projects related to chemical engineering while serving as a platform for constructive discussion and research. Furthermore, this will "Demystify" Chemical Engineering to the rest of the Institute.

SETTING UP OF THE LAB

Location of ChemE TL and the Space Allocated

The space for ChemE TL has been given inside S2-Bay near the far end of the infinity corridor. We could finalize two rooms with a combined area of roughly 1000 ft² for the lab through discussions.

Renovation and Staffing

The two rooms required extensive renovation for ChemE TL to function properly. We have finished the renovation in the exterior room around January, and we are expected to finish renovating the 2nd room a week from now. For staffing, we have arranged a UG lab technician to shift his timings to accommodate the working hours of ChemE TL. We did this under the advice of the FacAd and our HoD.

EQUIPMENT PROCUREMENT

Gathering Suggestions and Feedback

From the experience of the previous managerial candidates, we learned that we had to approach students individually and ask them to get constructive and informative feedback. While doing so, we came to know that Microfluidics was a community favorite, and everyone was eager to get their hands on it.

We also received suggestions to incorporate ML projects to widen our reach.

While we had some feedback to include bio-related projects, we decided not to focus there due to infrastructure issues. To sum it up, we got good responses, and we were able to gauge that there was a lot of enthusiasm behind the lab.

Collaboration with Technoventor

We collaborated with Mr. Pratik Ghadkar, who leads the team at Technoventor, to understand the tendering process during the procurement process. He has also taken up many projects in IITB and was suggested by Mrs. Damayanti from Makers Bhavan Foundation.

We have also planned to conduct technical workshops to get the students up to speed, given the long break from hands-on technical activities. We aim to complete it in the first month of the lab's operation and with the support of Technoventor. Technoventor has agreed to let us call on their engineer at IITB, stationed here for a year, for installation, servicing, and training.

Phase-I Equipment

Due to the vastness of the field of Chemical Engineering, we decided to procure the basic and the necessary equipment needed for tinkering as the Phase-I tender. In December, we created a list and submitted the tender to the Dean ACR's office. The tender consisted mainly of an FDM 3D Printer, essential electronic equipment, and the mechanical tools needed in a fabrication lab.

We decided to float the tender as a turnkey project for logistical ease. This meant that in the tender, we also had to give the specifications for the furniture for the lab, like working tables and storage facilities, while ensuring that the lab was electrified accordingly.

The Phase-1 equipment was delivered in the first week of April, and we are electrifying the tables and installing the equipment. The equipment and furniture had a combined cost of roughly 12 Lakhs, and with the renovation of the Lab space taking up around 3-3.5 Lakhs, we have currently used up 16.5 lakhs of the 50 Lakhs that was allocated for the set-up of the Lab.



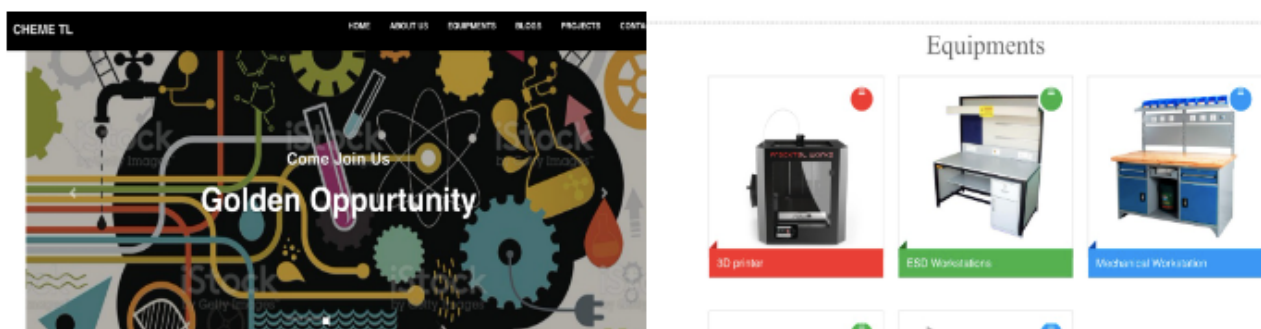
FUTURE PLANS

Next month, we aim to float a tender for Phase II of the equipment, including pumps, valves, and other essential equipment related to chemical engineering. It is also to be noted that we would purchase the low-cost equipment and consumables separately via the budget allocated for direct procurement. Furthermore, we want the Lab to be sustainable in the long run, and for this, we will not be buying specialized high-cost equipment which would not see frequent use. We plan to collaborate with the department labs and use their equipment on a need basis by collaborating with Profs and RAs.

THE CHEME TL WEBSITE

A Website represents the critical portal through which we would communicate official information and content representing the Lab (including the blogs) and contain the inventory database and various Project ideas and topics, which could serve as a good starting point for the emergence of newer innovative ideas among students. It is thus a one-stop solution to find out what the ChemE TL is about.

Status: The website has been designed, and we are working on hosting it on the gymkhana servers. This would be one of the priorities of the next ChemE TL team.



SOCIAL MEDIA HANDLES

We have created social media pages for the lab on multiple social media platforms (Instagram and Facebook). We are yet to launch the social media handles officially. The original plan was to launch them along with the lab's establishment, but since that was delayed, we plan to launch them early subsequent tenure to publicize the webinars and workshops we plan to conduct.

We have scheduled to release an initial blog series for the content in these and have prepared blogs on topics like 'Digitalisation in the Chemical Industry,' 'Microfluidics,' and 'Additive Manufacturing.' Once we integrate our website with the gymkhana servers, we will start posting the blogs via our website and publicize them through the social media handles like a regular blog series.

LOGISTICS & EVENTS

Long Term Projects

We feel that ChemE TL would be defined by the quality of work being done in the Lab, and hence we want to double down on long-term projects. The entire project flow was ideated and planned out with discussions with students and professors alike. This summer, we plan to launch these projects and get students working on them. We floated a survey to get a rough idea of the number of students interested in participating in the projects. It revealed that roughly 35-40 people are interested. We feel that we can take it up to 50 students with proper publicity.

Yearly Themes

We feel that the events of ChemE TL cannot be conducted similarly to the institute clubs because of the differences in the target audience, i.e., to have constant participation, the events would have to be unique every year or be repeated in a cycle of 3-4 years.

Therefore, we planned that ChemE TL set a yearly theme to base its short events and workshops on. Annual themes give us the following advantages.

- It gives the managers a select area to focus on for each year, and similarly, it makes it easier for ChemE TL to find collaborators and partnerships for the year.
- The students would start with no knowledge of the theme and end up well versed and informed about the theme, even as far as going for a project in the area.
- Some possible themes are Pollution Control & Biochemical Engineering, Batteries & EVs.

CHALLENGES

As expected, there were a lot of challenges during the setup of the lab. Firstly, the groundwork by the previous managerial team was done without taking adequate feedback from the students. This cost us an additional month to take proper feedback from scratch. Furthermore, chemical engineering as a discipline was not ideal for tinkering, and we had some difficulties ideating the projects that could be done in the lab.

While it was easy to arrive at the generic equipment needed for the lab, finalizing the specifications of some Chemical Engineering specific equipment was significantly more complicated. In addition to this, there were delays in the renovation process which made it harder for us to decide the specifications of the furniture required for the lab.

The core ideology behind ChemE TL is to try something new, and since we are one of the first tinkering labs for chemical engineering in the country, we have to experiment to find out what works for us and what does not. Additionally, the dip in hands-on technical knowledge in the institute caused by the pandemic constrained our mentor pool to only the Ph.D. students. Lastly, keeping the teams motivated throughout their project would be a challenge in the long run. For this, we have come up with reviews and sessions to engage the project teams, and we are ready to do the needful in the coming tenure.

OVERVIEW

The Controls and Dynamical Systems Student Reading Group or CDS-SRG creates a platform for students to discuss, collaborate and exchange views on topics like Control Theory, Automation, and Robotics.

Over the years, we have witnessed an increase in the number of projects related to being pursued under various initiatives by ITC. These projects have been instrumental in sparking enthusiasm toward robotics in many students. These projects are, however, in most cases, pursued without sufficient depth in theoretical and practical knowledge in areas like analysis of dynamic systems and the design of control and filtering algorithms, to name a few, which eventually leads to the original objectives remaining unfulfilled. We envision bridging this gap through this reading group, promoting discussion on topics in controls, facilitating exposure to the associated mathematics, and delving into implementation details involved in real-life applications. We also want this exposure to encourage more students to pursue research theoretical or implementation-based in these areas.

PUBLICITY

We have updated and launched our website, which contains information about our past and upcoming events. It is also the platform for our upcoming blog series:

<https://sites.google.com/iitb.ac.in/cds-srg-iitb/home>



EVENTS

PG Tech Weekend

Abstract

Optimal Control Theory deals with certain optimization problems involving a controlled dynamical system in which the trajectory can be altered continuously in time by choosing a control parameter continuously in time. Such problems can be tackled broadly by Indirect and Direct methods. Indirect methods are based on the well-known Pontryagin's maximum principle, which uses tools from the calculus of variations and functional analysis, while direct methods see the OCP through the glasses of optimization. In this talk, the speaker briefly touched upon direct trajectory optimization methods and some numerical schemes based on approximation theoretical methods.

Speaker Bio

Siddhartha is a third-year Ph.D. student at Systems and Control Engineering, IIT Bombay, working with Prof. Debasish Chatterjee and Prof. Ravi Banavar. His research interests lie in optimization theory & optimal control, approximation theory & numerical analysis, and differential geometry.



Several other initiatives are in the pipeline, like CDS-SRG's new youtube channel, website, research talks by professors are in the pipeline, and some are completed as well.

Insti Tech Databasing:

Insti Tech Databasing was a portal that we created to have a record of the various projects done by the students. Students from different clubs and institute bodies could access this portal to add their skills and projects.

Inter IIT Portal:

The Inter IIT Tech Meet is going to be held in the month of March. For this, we worked on creating a portal catering to the needs of it. In this students from the institute can log in using their SSO login and update their skills accordingly. Your batch and branch will be fetched automatically and you can rate your skills according to your level of familiarity. Additionally, you can also refer your friends during the selection procedure.

Link: <https://itc.gymkhana.iitb.ac.in/inter-iit/>

INTER IIT PORTAL

Hi, Niharika Sanjay Maheshwary

Idap:	190100141@iitb.ac.in
Batch:	2019
Branch:	Mechanical Engineering
Programme:	Bachelor of Technology

A Skills

- AI/ML
- Coding (C++, Java, JavaScript)
- Project Management
- Mechanical Design
- Manufacturing
- Computer Vision
- MLP
- Simulation Case Study
- Climate Tech
- Agri Tech
- Autonomous Vehicles
- Waste Technology
- Energy Engineering
- Finance
- Rural Innovation
- Algorithmic Trading
- Communication System
- AR/VR
- Robotics
- Business Planning
- Electric Vehicles
- Blockchain
- Cybersecurity
- Policy Making
- Health Tech
- Space Tech
- Ed Tech

B TECHTEAMS

Competitions and Project Portal:

We created the competitions and projects portal so that students can directly register for projects within ITC using these portals.

Revamping main ITC website:

Our team worked on the main website and created a dashing and more fascinating ITC website for this year. We implemented some more new pages in it like Tech teams, clubs, ITSP etc containing all the information and links of the bodies working under ITC along with the Tinkerers' Lab. The site provides the brief knowledge about the ITC, its functioning and its PORs.

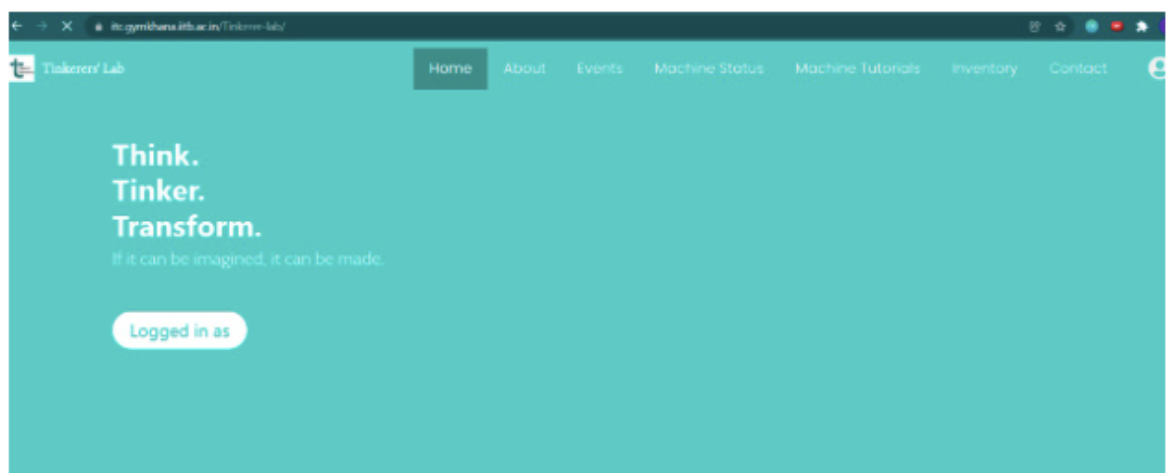
Link: <http://itc.gymkhana.iitb.ac.in/>



Tinkerers' Lab Website:

Tinkerers Lab, one of the best ITC body, is now also available on internet to interact with the tech enthusiasts. We created its website in accordance with the lab's need and functioning. We implemented Inventory(cart) system for easing the issuing of the machinery items and to check the availability of the machines in the lab. The website also contains the admin side of the lab by managing and monitoring all the activities of the users and machines. We also introduced Machine status option along with the ongoing events and machine tutorials.

Link: <https://itc.gymkhana.iitb.ac.in/Tinkerer-lab/>

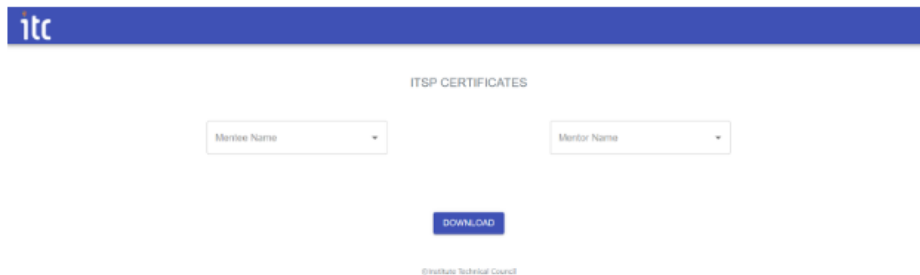


ITSP SoC SoS Certificates generation published in portal:

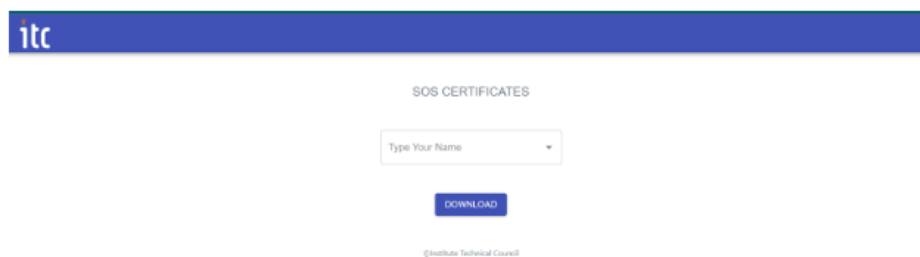
We implemented a dynamic ITSP SoC and SoS Certificate generation in portal.

The Website ask out the names of the mentees along with their mentors and provide them with the certificates of the events they took part in.

Link: <https://itsp-certificates.netlify.app/> <https://sos-certificates.netlify.app/>



The screenshot shows the 'ITSP CERTIFICATES' page. It features a blue header with the 'itc' logo. Below the header, there are two dropdown menus labeled 'Mentee Name' and 'Mentor Name'. A blue 'DOWNLOAD' button is positioned below these fields. At the bottom, there is a small text link: '@Institute Technical Council'.

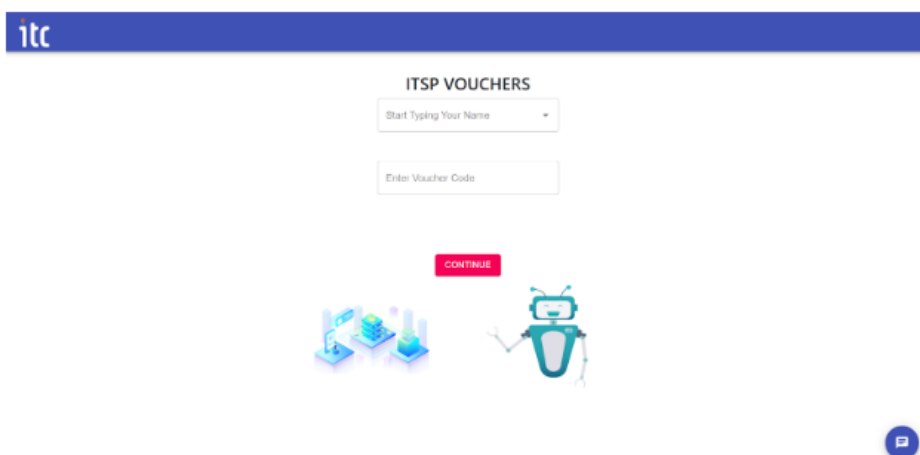


The screenshot shows the 'SOS CERTIFICATES' page. It features a blue header with the 'itc' logo. Below the header, there is a single dropdown menu labeled 'Type Your Name'. A blue 'DOWNLOAD' button is positioned below this field. At the bottom, there is a small text link: '@Institute Technical Council'.

ITSP Vouchers Portal:

The website contains the vouchers assigned with the respective names so that winners can sign in with their coupon code and redeem their vouchers. They can purchase technical products from their vouchers.

Link: <https://itc.gymkhana.iitb.ac.in/covid/>

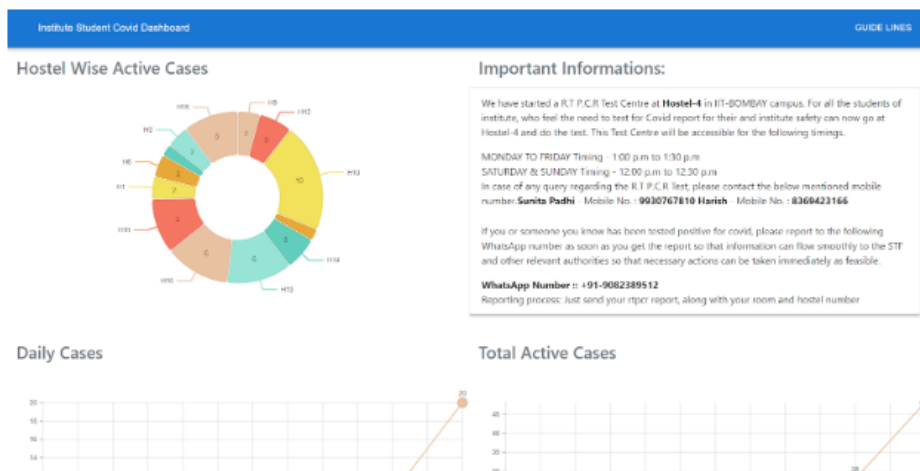


The screenshot shows the 'ITSP VOUCHERS' page. It features a blue header with the 'itc' logo. Below the header, there are two input fields: 'Start Typing Your Name' and 'Enter Voucher Code'. A red 'CONTINUE' button is positioned below these fields. At the bottom, there are two illustrations: a laboratory setup with beakers and a blue robot character. A small blue chat icon is visible in the bottom right corner.

Covid Dashboard:

For the continuous monitoring of the hike of the covid cases inside the institute, We developed the Covid Dashboard containing the graph views and pie charts of all the covid cases along with their hostels ,wings and rooms which are sealed.This Webapp is complete dynamic showing the curves of the covid cases on day to day basis.

Link:<https://itc.gymkhana.iitb.ac.in/covid/>



Payment for Deltas Conference:

Payment gateway integration for deltas conference organised by IIT Bombay

Link: <https://www.aero.iitb.ac.in/deltas2022/>



INDIAN INSTITUTE OF TECHNOLOGY, BOMBAY
महाराष्ट्र प्रौद्योगिकी संस्थान, मुंबई



**International Conference on
Design and Engineering of Lighter-
Than-Air systems
(DELTA-2022)**
Payment



Payment Details	
User ID	5/P
User Name	190110219@iitb.ac.in
Payment Description	Payment for deltas conference
Amount Due	5500.0
Mode of Payment	<input type="text" value="PAYU PAYMENT GATEWAY"/>
Note:	PayU Payment Gateway would include payment options like Net Banking, UPI etc. as applicable.
	<input type="button" value="Proceed"/>

Email: deltas@iitb.ac.in | deltas@iitb.ac.in

Name

Email address

Phone No.

Category

EMR Portal for Student Wellness Center (SWC) [In Progress]:

A portal in progress for scheduling appointments with various counsellors.

Design Team

They say you never get a second chance to make a first impression.

Graphical documents often act as an introduction as well as certification to the activities to be held, also it's safe to say that it's important to make it unique and engaging by creating an eye-catching design that makes the viewer check out what the event is all about.

A successful design is not only packed full of interesting and useful information about the event, but it says a lot about the team which has worked tirelessly to organize it. Team Design achieves this by encapsulating what the organizers wish to convey, both stylistically and in terms of personality.

Core Members and Club posters

The work started with creating posters to spread the list of core members and their associated conveners for each club and support councils. The challenge in the core poster was to accommodate all members in a single document. The final design consists of background graphics related to every club of ITC giving a sense of variance. The club poster consists of background graphics related to that particular club with their club logos. It includes details of core members along with associated conveners.



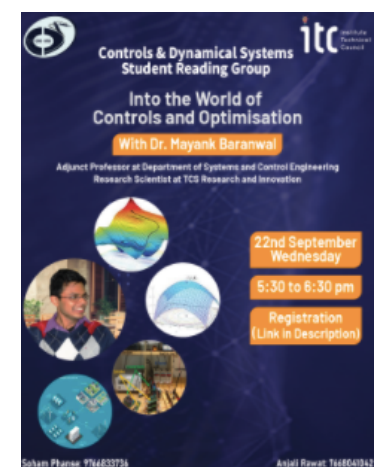
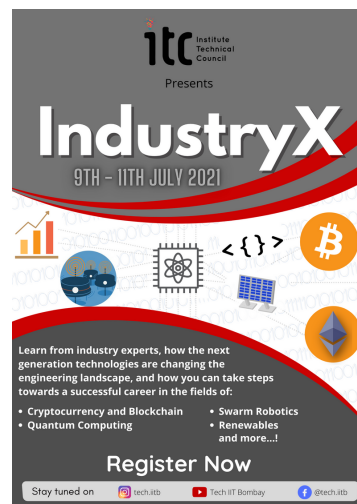
Design Team

POSTERS

A poster is an element used for the promotion of events or workshops which are put up in a public space for mass consumption. Typically, it includes both textual and graphic elements. They are designed to be both eye-catching and informative and this capability of posters is used by various clubs to spread information about upcoming events or workshops to the world.

Our team has designed posters to announce the introduction of various events and workshops, their schedules, and the results of competitions. The designs are developed keeping the theme of the event in consideration and are published over various social media platforms for mass reach.

Following are some of the posters the team has created till date.



CERTIFICATES

Certificates are not just a graphical document, they state that one has been trained or educated in specific criteria through the workshops and events conducted by Institute Technical Committee.

Our team has come up with various such certificate designs for various events and workshops conducted by ITC clubs. Some are designed to showcase participants' Achievements or Awards they have got for their excellence, some are given to participants to keep them motivated and encourage them to participate in upcoming activities, and some for those involved in organizing activities which gives a sense of ownership. All these designs have their own theme in connection with the activity for which they are designed.



“ Reward those who've earned it ”

IndustryX

During the weekend of 9th-11th July 2021, we held the IndustryX weekend, a series of virtual talks and Q&A sessions conducted by the industry leaders and leading researchers in rapidly developing fields. Over these three days, various speakers shed light on fields Swarm Robotics, Space Technology, Future of Renewable Energy, Cryptocurrencies & Blockchain, Fintech & Ecommerce, Deeper look into Software Technology, Quantum Computing. For publicity of this event, we posted 5 videos on Facebook and Instagram and Received an enthusiastic cumulative participation of 370+ students.

Videos:

1. <https://www.instagram.com/p/CQ5127wnQmJ/>
2. <https://www.instagram.com/p/CRGFhYTn7dB/>
3. <https://www.instagram.com/p/CRIwSHRnb7s/>
4. <https://www.instagram.com/p/CRLhk0THeuD/>
5. https://www.instagram.com/p/CS_-AyRD6QJ/



PG Tech Orientation

A tech orientation for PG students was conducted on the 8th of August, 2021 at the start of the semester. We live-streamed the orientation on ITC's YT channel and gauged a viewership of approximately 700+. A 1.5hrs video was edited and streamed live on ITC YouTube channel. The streaming was interactive with quizzes and polls in between in the YT chats The session began with overview of ITC and short introduction by GSTA, PG Nominee and Project and Tech Team Nominee. Over the 1.5 hours event, participants were provided the social media links of tech bodies to connect, ask doubt and to stay updated.

Videos:

- Trailer: <https://www.instagram.com/p/CSOfWxJDpeB/>
Event: <https://www.youtube.com/watch?v=X0Y6--pUjQw&t=5s>



Team Shunya Orientation

The team presents before you our brainchild Project Daksh, where you can witness what went behind the energy-efficient cluster level designs proposed and the team behind the wonderful work. The trailer video was created for publicity among students.

Trailer: <https://www.instagram.com/tv/CREXwidjYno/>

TechCup

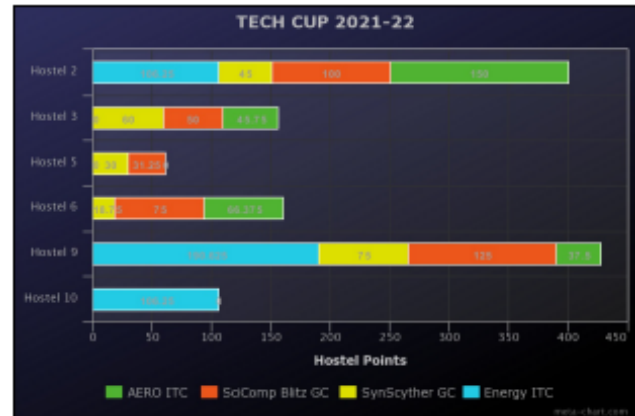
During this tenure, we have two categories of contests

-Traditional General Championship (GC)

-Industry Technical Challenge (ITC)

For TechCup, We Restructured this year Traditional General Championship (GC) with a combination of both Traditional General Championship (GC) and Industry Technical Challenge (ITC) to solve participation problems and to give participants industry exposure and more border view.

Trailer: <https://www.instagram.com/p/CUVDhHsjQIY/>



Inter IIT Tech Meet



Inter IIT Technical Meet is an exciting annual technical event where students across all the IITs come together for spectacular technical competitions and expositions, entrepreneurial undertakings, and activities with social Impact. The theme for this edition is - "To Newer Horizons: In the wake of the pandemic". The format similar to previous editions is comprised of problem statements and showcases. The problem statements are further categorized into high-prep, mid-prep and low-prep. Created 4 videos (2 trailers and 2 reels) for the publicity of Inter IIT Tech Meet.

Publicity Videos:

https://drive.google.com/drive/folders/1LOOCCGrqjRGh2JGqVRlkmu0d5_4USiDDd?usp=sharing

Institute Technical Summer Projects

Institute Technical Summer Projects aka ITSP is an annual program organized by ITC for freshmen. The aim is to provide first-hand technical exposure over the period of summer vacations. It also serves as a platform where one explores a field not aligned with their own major. Students are encouraged to also target some real-life problems that can be solved using technology. Selected projects are provided with mentorship by senior undergraduates who have worked on similar projects.

Created trailer video for the publicity. <https://www.instagram.com/p/CbsYKB3lLcF/>

InstiWiki

InstiWiki is a one-stop solution to know everything about your beloved Insti. The website contains relevant information about various councils, clubs, and most of the activities in our institute. InstiWiki is envisioned to be a one-stop Wiki for the whole institute. It holds vast potential. Created trailer for launching of the event. <https://www.instagram.com/p/CZedD5cPffY/>

TechCup

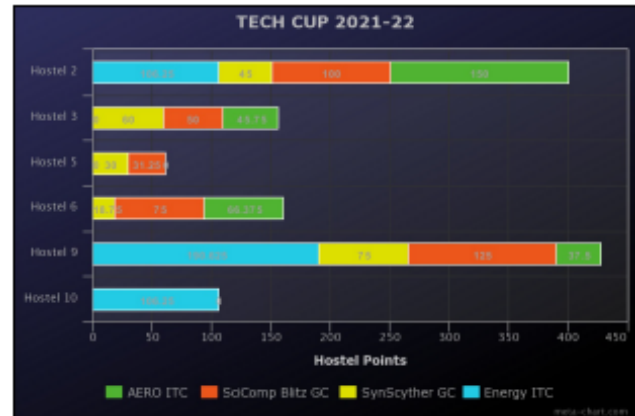
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Will be updated soon



Thank you!!!

The efforts of the council were always backed by constant support from the institute authorities. Special thanks to the Dean SA, Prof. Tapanendu Kundu, Chairman, Technical Council, Prof. Rajkumar Pant and the SAC office who helped us throughout the administrative tasks.

Thank you, everyone, for supporting us and keeping our motivation high with your enthusiasm for participation in the ITC activities.

Keep tinkering!





itc

**Institute
Technical
Council**

Learning Never Stops

<https://itc.gymkhana.iitb.ac.in/>

