



Science and Technology Council



Mid Term Report (2017-18)

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Structure of Council

Clubs:

- : Aeromodelling Club
- : Astronomy Club
- : Electronics Club
- : Programming Club
- Robotics Club

Hobby groups:

- : BRaIN
- : DesCon
- : Gliding
- : Rubik's Cube
- Science Coffee House

Teams:

- : Team IGVC
- : Formula SAE
- AUV

Executives:

- : Media and Publicity
- : Management
- : Tinkering Lab
- Council Executive

Budget

All the council activities including summer camp, workshops and competitions are supported through Gymkhana Fund.

Gymkhana Budget: The budget for the term 2017-18 is Rs. 724950. The council has utilized approximately Rs. 13,39,000 for conduction of various activities up till now. The extra budget was reallocated from SSF and SAF.

The institute teams and advanced long term projects are supported through other institute funding sources. Currently, council has one Dean R&D account for the same with budget of Rs. 8,30,000. Still, the council needs to find new funding sources to sustain its teams.

Overview of Activities

I. Sci Tech Summer Camp 2017 - Introductory Session

The session was organised to introduce the freshmen about Sci-Tech Summer Camp 2017. All the club coordinators and hobby group leaders presented various project ideas and events planned for the summer. Apart from this, core team members (including the General Secretary) were there to represent the council and discuss with students about the need and motivation behind such an activity.



II. Sci Tech Day 2017

Every year council organizes this event to commemorate the last years performance and foster a sense of belongingness among all its members. The event started with exhibition of all the major projects followed by a felicitation ceremony. It was organized on April 16, 2017 where the current Dean of Students' Affairs and Faculty Counsellor of Science and Technology Council felicitated the students for their contributions.

III. Sci Tech Summer Camp 2017

All the clubs and hobby groups undertook projects for students. Around 350 students stayed back in campus from 20th May to 9th July for the Sci Tech Summer Camp 2017. Students along with club coordinators worked on different projects under different domains of science and technology.



IV. Summer Camp 2017 Evaluation and Exhibition

All the clubs and hobby groups organized final summer camp presentation with an exhibition inviting the whole campus community on 9th July 2017. The respective faculty advisors and senior members were also present. They interacted with the teams and evaluated the projects.

V. Sci Tech Pavilion

An exhibition is organized every year during Orientation Program to provide a complete exposure of all kind of council activities to UG and PG freshmen. This time SNT Pavilion was organized for four days where freshers got to interact with the club members, discussed with them their prior experiences, and desire to be a part of any particular club. Some faculty members were also there to see the students' work and appreciated them.

All the projects done under Science and Technology Council including Institute teams were there to showcase their work.

VI. Lectures and Workshops

Lectures and Workshops were organized in three different phases: Summer Camp Series, Introductory Series and Takneek Series, providing freshmen with multiple opportunities to be a part of any club or council activity. The council also organised introductory workshops from different clubs between 5-7 August 2017 for freshers. Further, some more workshops were organised to give students an exposure for Takneek events.



VII. Takneek 2017

The intra IITK science and technology championship was organised during 7th – 10th September 2017. Crypto and SNT Code were organised on 1st and 2nd September, with participation from all the five pools. Effort to conduct some events on same weekend as that of SnT Code was success and Crypto went on smoothly without any technical glitches and saw a huge participation.



VIII. Talks and Meets

Science Coffee House conducted the introductory talk session of the year primarily aimed at the freshers. The freshers were introduced to each other and information about the club was disseminated.

Five talks were given namely:-

- ❖ 'OMG! There is a black hole in my basin!' - black holes and general relativity [Navya Gupta]
- ❖ 'The Halting Problem' [Chetan Vuppulury]
- ❖ 'And you thought you knew infinity' - countability and uncountability in Mathematics [Himanshu Shukla]
- ❖ 'Language and AI' [Prannay Khosla]
- ❖ 'The Quantum Solution - Topological Quantum Computing' [Aniket Maiti]

Apart from the talks, the freshers were briefed about the events in takneek conducted by the Science Coffee House.



IX. Sci-Tech Week

Sci-Tech Week;17 was conducted in first week of November'2017 where Lectures and workshops were held on advanced topics and a competition on club level was organized on weekends comprising of Hacka-thons and quizzing competitions.

X. Winter Camp 2017

Winter Camp was also organized by the council this year in Dec'17 where students were encouraged to do projects through which they can participate in technical festivals. Also, short duration projects like Club Automation were completed within the time frame.

Winter Camp has now started to become a culture in the council and thus to promote the camp more profusely like Summer Camp, proper encouraging steps are necessary for next two years.

XI. 6th Inter-IIT Tech Meet

Science and Technology Council took a contingent of 33 students to participate in 6th edition (2nd official) of Inter-IIT Tech Meet where we grabbed 1 gold medal, 2 silver medals, 4 bronze medals. We overall stood 4th in 21 IITs.

External Events

- NIOT SAVE - Team AUV is working on his robot and are planning to participate in NiOT Singapore in July'19.
- IGVC (Intelligent Ground Vehicle Competition) - The team is working with Prof. Mangal Kothari and are expected to complete there task by December. The team is planning to participate in IGVC'18 being held in Michigan in June'2018.
- Formula Student India 2018 - This year IITK Motorsports took part in the FSAE and they fabricated the whole body using carbon fiber which enhance both the looks and strength. The team stood 15 in the competition comprising of 60 teams from all over India.

Projects

I. Aeromodelling Club

Balsa Payload Carrier

An airplane with maximum payload fraction within a limited dimension.

Composite Glider

A Glider made with composite material like glass and carbon fibre to improve the aerodynamics of glider.

Other projects were -

F3P

Magnus Plane

RC Omithopter
Wing Configurations
Quadcopter
Aerial Maneuvers
Composite Flying Wing



II. Astronomy Club

Automatic Star Pointer

To guide the beginners for the observation of sky using the computer software which provides the coordinates of the stars to the laser pointer mounted on a system of gears and motors.

Observatory Automation for photometry(OAP)

To automate the whole procedure starting from the opening of the dome shutters of the observatory to the process of aligning to the desired celestial objects (like stars, Messier etc) and taking photographs, along with remotely controlling the observatory.

- " During summers , Astronomy Club , IIT Kanpur was contacted by the Nutspace Edutech Limited to host an observation session at our observatory for the school students of classes 2 to 9 under the guidance of Prof. Amitabh Pandey.

III. Electronics Club

Brain Computer Interface

Project was aimed at extracting and classifying the EMG signals from various regions of Brain through electrodes placed on scalp. Classified four types of thoughts : Rest, Intense Math, Fast Calculations on Blackboard, 3D Object Imagining. When a test subject does one of the above tasks, the computer accurately predicts the task being performed. Project was recognized as "Best Overall Project of SnT Council".

Neural Networks on FPGA

Implemented neural networks on a FPGA board. Main focus was to identify objects in a given image. Was able to store the picture and display it on the monitor using the neural

network algorithms. Project was awarded with “Best Documented Project” by SnT Council.

Stereo Vision for the blind

Implemented a depth map using OpenCV algorithms. Used object classifier to classify all the objects in the vision. Combined above to tell which object is present at what distance. Fused the above arrangement with GPS and map APIs for navigation of the blind.

IV. Programming Club

Student Search

Student Search platform was developed by a group of 5 students.

Gymkhana Nomination Portal

Portal for managing nominations for overall Gymkhana Posts.

Depression Therapy Using ChatBot

An ML navigated bot to detect depression stages and then recommend the therapy through the chatbot.

Puppy Love

The Puppy Love that happens every year was revamped, with new features in it.

Augmented Reality

An AR Navigation app, which provided real time directions from two parts.

SnT Web App

A web app for the SnT council for its year long activities, with an exhaustive admin panel for adding various club coordinators and hobby group leaders, and posts.

Ethical Hacking

A group of 25 students, divided into 5 teams were trained in aspects of ethical hacking and computer security, prepared them for Capture the Flag contests and discovering vulnerabilities in different web pages.

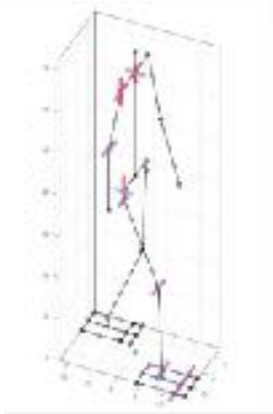
Other major activities included

- " Linux Install Fest
- " Summer Programming Contest (SPC)
- " Weekend Programming Contest (WPC)
- " Freshers' Programming Contest (FPC)

V. Robotics Club

Humanoid

The objective of the project was to analyze the gait of Humanoid and identify minimum torque requirements for the joints along with simulation for various tasks for Humanoid.



Club Automation

Aim of this project was to automate the club activities like lights, fan and opening of door of the club.

AUV Mini Projects

Team AUV circulated various mini projects under the club for students. Major Projects were Battery Managements System and image Detection of Torpedo targets.

Prosthetic Arm

A 5 DOF Prosthetic Arm capable of replicating human hand motions.



Andro-Bot

Aimed to build a home assistant with an android platform on its top can locate around the house and be your personal home assistant.

VI. Rubik's Cube Hobby Group

Blindfolded Solving

Students explored blindfolded solving. The aim of the project was to learn the techniques for memorization and solving that enable one to solve the cube



blindfolded. Workshops were conducted for Beginner and Intermediate methods for the same. In their final evaluation, all the students attempted blindfolded solves.

FMC Solving

Advanced techniques for solving the cube in fewest moves were studied. Students were able to grasp most of the concepts well at the end.

Mathematical Analysis of Rubik's Cube

The main objective was to mathematically analyze the possible combinations of cube and the paths to solve it along with recurring back to a mixed cube.



Recommendations

- A centralized place is required for council activities (technology center) where all clubs and teams can work together in collaboration, infrastructure can be shared to cater needs of all and learning can be enhanced.
- The council also requires a proper space to preserve the projects, it may also serve as a Hall of Fame where the projects will be kept for display.
- Better infrastructure to the clubs. Few clubs still require basic infrastructural facilities like computer system, cooler etc. for which additional funds should be allocated for them.
- Council has started recording lectures and workshops conducted by students but it also require some more infrastructure to record the lectures properly.
- Before allocating budget to teams/clubs to participate in any event, a proper status check must be done of the team in order to ensure that they can participate in the event. A committee shall be formed within the council comprising of General Secretary, Senior Executive Council and Faculty Advisor to do all these checks before allocation of participation fund.
- Gliding Hobby group can be desolved and instead an Executive, Gliding Club can be introduced in the council as there is need of only one person who will be a member of Gliding Committee of Institute and he as well can serve as point of contact for campus Junta.