

# Pre Term Report

Science and Technology Council

2016 - 2017



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# Vision

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My vision for the Science and Technology Council will be to bring student activity in consonance with the broader technological forum. The aim is to promote students from the grass root level bootstrapping them through Takneek, gradually improving skills, developing capabilities to plan and implement more involved, through cutting edge projects. Corporate ties will be fostered for support so that students can learn how to contribute at the ground level of a growing company.

I envisage a council where the experience of professors and senior students is used in the most efficient way. The council will expand to encompass more technologically advanced projects and at the same time, cater to the needs of the community. This will form a sustainable, organic integration of various clubs into the technological community of IIT Kanpur and help us develop a holistic technical culture.

## Structure Of Council

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### Clubs:

- Aeromodelling Club
- Astronomy Club
- Business Club
- Electronics Club
- Programming Club
- Robotics Club

### Hobby groups:

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

### Teams:

- Robocon
- BaJA SAE
- Formula SAE
- AUV

### Executives:

- Design
- Editorial
- Finance
- Management
- Tinkering Lab

# Overview of Activities

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## 1. Sci-Tech Summer Camp 2016 – Introductory Session

This session will be organised to introduce the freshmen about Sci-Tech Summer Camp. All the club coordinators and hobby group leaders will present their project ideas and events planned for summer. Apart from this, core team members of 2015-16 (including the General Secretary) will be there to represent the council and discuss with students about the need and motivation behind such an activity.

## 2. Sci-Tech Day 2016

It is an annual event under the council, organised to commemorate the last years performance and foster a sense of belongingness among all its members. The event will consist of an exhibition of all the major projects followed by a felicitation ceremony. It will be organised on April 9, 2016 where the current Dean of Students' Affairs, Dean of Resources & Alumni and Dean of Research & Development will felicitate the students for their contributions.

## 3. Sci-Tech Summer Camp 2016

All the clubs and hobby groups will be undertaking projects for students. The tentative dates for the summer camp are 15th May 2016 - to - 24th June 2016. The students along with the coordinators and senior mentors will work on these projects.

## 4. Sci-Tech Summer Camp 2016 - Final Evaluation

All the clubs and hobby groups will organise final summer camp presentation between 23rd – 25th June 2016. The respective faculty advisors and senior members will be invited to interact with the teams and evaluate projects. From this year onwards, the whole campus junta will be invited to these final evaluations of Summer Camp projects so that students participating in the Summer Camp would get a better platform to showcase their talent as well as learn about other projects. This would give campus community a better opportunity to get to know about the projects going on in the council.

## 5. Lectures and Workshops

Lectures and Workshops will be organised in three different phases: Summer Camp Series, Introductory Series and Takneek Series, ensuring the freshmen get multiple instances to be a part of any club. The council will also organise workshops from different clubs between 5-7 August 2016 for freshers. Workshops will be organised in a way such that student will get exposure for Takneek events.

Different Clubs will also organise lecture series and workshops all over the year.

For eg. embedded week will be organised by Electronics Club during 1st Week of April consisting of a lecture series on various types of modern electronics, Programming Club will organise a lecture series on machine learning, etc

## 6. Sci-Tech Pavilion 2016

An exhibition is organised every year during orientation to provide a complete exposure of all kind of council activities to UG and PG freshmen. Freshers get to interact with the club members, discuss with them their prior experiences, and desire to be a part of any particular club. The faculty members also get to see the students' work and appreciate

them. This year also, the projects done under the council during 2015-16 and 2016 summers will be put up for display in the pavilion.

## 7. Takneek 2016

The intra IITK science and technology championship will be organised during 1st – 4th September 2016. The SnT code will be organised on 27th August, with participation from all the five pools. I will provide individual level recognition for winners of individual/team events. I will try to conduct some events on same weekend as that of SnT Code (exact events have not been decided yet but they will include events that are conducted every year in Takneek and require mass participation).

## 8. Winter School

From this year, the SnT council will organise a winter school. This will not only be aimed to teach freshers, but will also host a variety of projects which motivated students want to pursue under different clubs of the council. An active example is the Winter School organised by electronics club every year.

## External Events

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### 1. Team Varun (AUV)

Team has already been registered for the competition named Students Autonomous Underwater Vehicle (SAVe) organised by National Institute of Ocean Technology (NIOT). The team has cleared two rounds of the competition namely PDR (Preliminary Design Report) and CDR (Conceptual Design Report). They have qualified for the final round of the competition to be held in October 2016, where they will present their final prototype.

### 2. SAE Aero Design East 2017

Team PUSHPAK has bagged 3rd prize in Micro Class during this year's event on an international level. Participation of the team in next year's competition will depend on the problem statement of the competition.

### 3. ABU Robocon 2017

After proving their mettle in national round and securing 3rd position in the competition the team is all set to represent IIT Kanpur in Robocon 2017. Problem statement for Robocon 2017 will be released in September 2016. The team has started preparing for it and are planning to conduct few activities this summer that will help the team for next year's competition.

### 4. BAJA SAE and Formula SAE

Last season our team performed well in the competition securing 8th position in Formula SAE and overall 13th position in BAJA SAE. This season also they will be participating in the event and they have started their preparations.

## 5. Techfest 2016

Techfest being Asia's largest Science and Technology Festival, we have been participating in it since a long time. This year also a contingent will prepare for the fest during winters and participate in it.

## 6. Inter IIT Tech Meet 2017

After being the first runner up in last Inter IIT Tech Meet students are excited about the next year's meet. The dates for the next meet have not been finalized yet, but we will be participating in the meet whose preparations will start from winter vacations.

# Clubs and Hobby Groups

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## 1. Aeromodelling Club

### Mission And Vision

Our main objective is to promote aeromodelling as hobby in our campus. We will try to introduce different categories of aeromodelling to as many people possible. Members will be exposed to new methods by collaborating projects and activities with experienced Phd. students.

Weeklong aeromodelling events will be held, fun filled open to all competitions will also be organised for the campus junta.

### Timeline

- Summer camp - May - June
  - Summer projects
  - Lecture on designing, XFLR and simulator flying workshop.
- August
  - Week - 1 RC plane workshop and introductory lecture
  - Simulator flying Weekend
  - Aug 15 Independence day Air Show
  - Week 4 - Takneek
- September and October
  - DORD project
  - Open to all competitions
  - Start of Year long Projects
- December
  - Winter Projects
  - Preparation for techfest
- January and February
  - Boeing Workshop
  - Delta Wing workshop
  - Republic Day Air show
- March
  - Techkriti introductory lecture
  - Techkriti preparations

## 2. Astronomy Club

### Vision

We attempt to bring about an interest and awareness in the field of Astronomy and Space Research. We intend to promote amateur astronomy through talks, competitions and shows. Astronomy is fun, but it can be even more fun when you do it with other people. Through various observation sessions by telescope and at the The Observatory for Astronomical Research (OAAR) built by the Club, we will try to impart hands on skills and knowledge to all those willing to learn.

### Initiatives:

- Conducting the biannual Astronomy fest of IIT Kanpur Eyes On the sky and make it more thorough and fun.
- Making the club more active online and on social media to increase participation improve club visibility and showcase the work done.
- Professional level Telescope making and handling sessions.

### Timeline:

- July SnT Pavillion, Orientation
- August Introductory Lecture and Introduction to Observatory, Telescope Handling Workshop, Planetarium Shows
- Before Takneek Astrophotography Workshop, Observation Sessions Hall level and institute level, Takneek Specific Lecture
- Oct First Week EOTS1
- Mid Sem Break Trip to Observatory
- After Mid Sem Break and before antaragini Planetarium show/workshop/lecture
- Jan Theoretical Lecture Series
- March 1st Week EOTS2

## 3. Business Club

### Vision:

Our Vision is to provide a platform for the entire campus residents to learn and understand the nuances of finance and business management. We wish to conduct a lot of workshops and guest lectures throughout the year to prepare the interested students for various off-campus and intra-campus business competitions. We would like to provide adequate resources to them for the same.

### Initiatives:

- Organize workshops on Advanced Excel, VBA Programming and statistical software packages such as R.
- Organize lecture series on business analytics which would cover analytic techniques like data mining, statistics, predictive modelling, regression analysis and forecasting
- Introduce semester ongoing lecture series on Business Analytics, Consulting and Financial Management (to be conducted by institute professors as well as guest lecturers).

## Timeline:

### Summers:

- Would majorly consist of workshops.
- Around 12 projects would be conducted under the Business Club this year.

### August (Before Takneek):

- Organize workshops on Advanced Excel, VBA Programming and statistical software packages such as R.
- Organize lecture series on business analytics which would cover analytic techniques like data mining, statistics, predictive modelling, regression analysis and forecasting.
- Introductory lectures explaining major case-study solving techniques.
- Introductory lectures for financial concepts.

### September (After 18th, i.e. Midsems)

- Seminar on Equity Research and Sector Analysis followed by lecture series on how market research is done and would be accompanied by several cases.
- Lectures on basic concepts in Marketing Management

### October:

- Creating teams and mentoring students for various inter-college competitions.

### Winters:

#### Targeted at 2nd yearites:

- Winter School in collaboration with programming club for second yearites (Ex: Stock Price prediction model for various companies in Bombay Stock Exchange)

### January:

- Introductory lectures on topics like Big Data Analytics, Machine Learning, Predictive Analytics and Modelling, along with basic financial and consultancy-related topics, with a focus on their applications in business. (to be conducted by institute professors as well as guest lecturers by final year students)

### February:

- Conducting google hangouts and other informal events over social media to increase student-alumni relations.

### March:

- Introducing summer projects to Y16 juniors via a series of lectures by execs who made the best projects the previous year.

### Miscellaneous:

- We would try to create a new B-Plan competition which would run similar to the lines of Microsoft code-fun-do. This would either be in collaboration with some other fest or it may be an independent event.



## 4. Electronics Club

### Mission and Vision:

- To make the club as a platform to discuss about matters which concerns our precious interest in electronics and bring out some cool, useful projects which could be put forward as our flagship products.
- To make the Electronics club as a fraternity, intra-bonded by a shared passion for electronics, rather than an imposed sense of duty or fear.
- To offer all the electronics lovers many chances throughout the year to learn, share knowledge from basics to advanced fields of electronics.
- Collaboration with other clubs (mainly non-technical) and help solve their problems with electronics. For instance, buzzer system -Quiz club: celestron auto-focuser for Astro Club.

### Initiatives:

- *Club inventory site*: To increase transparency between club inventory and greater IITK community, To minimise effort from starters by providing related projects and info regarding working of corresponding device, For proper online inventory management, component issues and dynamic updation of inventory.
- *Online Forum Section on Club Website*: Making a Forum Section on Electronics club website, anybody can start new topic and ask any doubt or suggestion he/she have.
- *Hardware Start-ups*: Through collaboration with E-cell, promote hardware startups of people passionate about designing and building .
- *Weekend hackathons*: To involve more number of people in club activities, to ensure continuous utilisation of club

### Timeline:

- April 16 : Embedded Week, lectures on Atmega and FPGA
- May-June 16: Summer Projects and summer lecture series on Arduino, Atmega, FPGA and Image processing
- July 16: SNT pavilion and displaying our summer projects
- August 16: Introductory workshops for freshers on digital clock
- September 16 (before mid-sem exams): Takneek events
- September 16 (after mid sem exams) to November 16: Weekend hackathon and mini project distribution
- December 16: Winter School
- January 17: Hardware hackathons and preparation for major events like Inter-IIT tech Meet
- March 17: Techkriti events

## 5. Programming Club

### Vision:

We plan to involve more people in the activities related to the club. Programming is an art required in almost all spheres of life, and we plan to inculcate that talent in the people who want to learn it. Introductory lectures and workshops will cater to the people who are willing to learn coding. On the other hand, highly motivated and knowledgeable people shall be provided with necessary equipment/resources required for whatever project they want to pursue under the club.

### Initiatives:

- Projects on demand:  
Students can take up individual projects as their own initiatives, and talk to the coordinators about it. If they are doing something significant and are able to complete it successfully, the coordinators will make sure they get recognised by the Gymkhana for that under programming club.
- Association with the incubation center on 6th floor, Rajeev Motwani building:  
The incubation center on the 6th floor of RM building, which also played a crucial part in organising the GDG DevFest has equipment such as high powered computers, graphic cards, etc. They want students to explore these avenues, and use them to the benefit of both parties.

### Timeline:

#### Summers:

- Introductory lecture series on git and LaTeX
- Workshops on Matlab/Octave/GNUPlot related tools
- Lecture series on data structures and algorithms (basics)
- Intra-campus programming contest

#### August (Before Takneek):

- Introductory workshop for freshers on introduction to programming
- FPC (in the weekend following the workshop)
- Editorial session for FPC
- Python workshop (After by-elections)

#### September (After 18th, i.e. Midsems)

- Web development (Lecture series: HTML, CSS, JS, Bootstrap)
- Workshop: Make your homepage
- Hackathon (Web based)
- ICPC preparatory series for beginners

#### October:

- ICPC preparatory series (advanced)
- Mid-sem Break (8th-16th) - League of Programmers in association with ACA
- WPC (22nd-23rd October)
- Lecture series on Information Security
- "Capture The Flag" based security contest
- Pre-ESC-Lab-Exam workshop

Winters:

Targeted at 2nd yearites:

- App development projects
- Object Detection in an image
- Shortest viable path finder from one destination to another in images
- Kinect based projects

Winter School in collaboration with electronics club for first yearites

January:

- Session on Google Summer of Code (to include git and irc)
- App development sessions
- Linux Install Fest
- Semester projects begin

February:

- Puppy Love
- Lecture series on advanced algorithms (Suffix arrays, network flows, computational geometry)
- WPC
- Machine Learning Lecture Series

March:

- Machine Learning Lecture series (continued)
- Lectures of LaTeX and computational tools (matlab/octave/gnuplot)
- Hackathon (ML/App dev based on reviews)
- Review of semester projects (after midsem break)

Miscellaneous:

- Google Developers Group Dev Fest
- Try to get other organisations to organise hackathons at IIT Kanpur like Yahoo HackU

## 6. Robotics Club

### Mission and Vision

- Promote interest for Robotics among the people in the campus by conducting various fun-filled activities among students.
- Ensure more new efficient projects on new ideas. We will focus more on quality of work under our club.
- Ensure the proper publicity for the club.
- Conduct professional workshops for students community.

### Initiatives

- Robotics Mechathon - A 24 hour Mechathon where teams will be given a tools kit along with basic components.
- Project Exhibition - A proper publicised event where all the old and new projects under club will be displayed.
- Lectures and Workshops on common electronic chips in association with E-Club.
- Winter School - Hobby projects to introduce first-yearites to the field of Robotics.

## Activities round the year

- Summer Camp (May - June)
  - Lecture and workshops on Inventor, Image Processing, ROS, PID etc.
  - Summer Projects
  - Labs and Facilities Visit
- Project Exhibitions (June End)
- Introductory Lecture and Workshop (July last week)
- Takneek (August - September)
- Professional Workshop and Lecture Series on Simulation via ROS (October)
- Winter School (December)
  - Projects on Mobile Robotics and IoT.
- Techfest preparation - (December)
  - MazeRunner
  - Pixelate
  - Robowars
- Inter IIT Tech Meet preparation- (December-January)
- Robotics Mechathon (January first week)
- Professional Workshop on Image Processing via OpenCV. (Just after Registration in December)
- Project Exhibition (Just after Robotics Mechathon)
- Techkriti Preparation (February - March)

## 7. BRaIN Hobby Group

### Vision:

We plan to involve more students from all departments in various activities of the hobby group. We will mainly use the hobby group for getting to know what wonders Biology contains and how it can be clubbed with other branches to form wonderful things. Students will be encouraged to perform activities on their own ideas and a platform for discussion will be provided. Encourage participation in events like Crime Run and various quizzes like the Darwin day quiz to spread awareness among the campus junta for evolution and other biological processes. Also we will try to get massive PG participation.

### Initiatives:

- Organize boot camp in the summer for a group of students who want to be part of the IITK team taking part in Biomod competition organized by the Wyss institute at Harvard.
- Organize a project in the summers which will have students from both UG and PG to increase interaction between the 2 groups and healthy discussion.

### Timeline:

#### Summers:

- Biomod boot camp.
- Summer Projects.

#### August (Before Takneek):

- Introductory workshop for freshers on Crime run.
- An informal discussion about a particular topic.

September (After Midsems)

- An informal discussion about another particular topic.

February:

- Promoting Darwin day by posters and a quiz on evolution.

## 8. Descon Hobby Group

Vision:

We plan to involve more students in various activities of the hobby group. Different activities include designing of pop-stick bridge, Spaghetti Bridge and other types of bridges. Along with that different structural analysis can be performed practically. Students will be encouraged to perform activities on their own ideas and use of different softwares for structural analysis will be encouraged more and more. Basics of designing and softwares will be taught through lectures and workshops throughout the year.

Initiatives:

- Projects on demand:

Students can take up individual projects as their own initiatives, and talk to the coordinators about it. If they are doing something significant we will make sure they get recognised by the Gymkhana for that under the hobby group and they will be given proper guidance and resources.

Timeline:

Summers:

- Introductory lecture series on bridge designing and SAP 2000.
- Workshops SAP/Revit/Staad.pro.
- Summer Project

August (Before Takneek):

- Introductory workshop for freshers on bridge designing and SAP 2000.

September (After 18th, i.e. Midsems)

- Workshop on AutoCAD.

January:

- Intra-Campus bridge designing competition (prize money will be offered.) for one week.

February:

- One-Two week small project for interested students.

Before Techkriti:

- Workshop on spaghetti bridge designing and AutoCAD workshop.

## 9. Rubik's Cube Hobby Group

### Vision:

Popularize speedcubing as a sport in campus and ensure that more amount of people take part in the same by actively participating throughout the year. Ensure introduction of other puzzles like Pyraminx, megaminx, skewb, square-1 in campus. Encourage participation in events like IORC and introduce more people to WCA.

### Initiatives:

- Intra IITK Open- To increase participation and spirit of cubing by introducing prize money in the same.
- Professional Workshops- Inviting top cubers from India for 1 day workshop. This would make more and more people coming to workshops considering a top cuber is coming.
- Use of social media- To increase number of active cubers by making sure that those who are not able to attend the workshops learn through tutorial videos posted on the page.

### Timeline:

- Summer projects- Including BLD, FMC and Mathematical Analysis from May mid to June end. Small workshops specially for project people would be introduced for other puzzles too.
- Summer workshop for 3\*3 around 18th May before start of projects
- August 2nd week- Workshop for 2\*2 and 3\*3 just after the fresher's nite.
- September starting- Intra hall events for Takneek
- October starting- Workshop for 4\*4, Pyraminx and Skewb
- November starting- Professional workshop
- January end- Intra IITK
- February after mid sems- Workshop for 5\*5, Megaminx
- March- Workshop for Square 1

# Future Perspectives

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## ● Long Term Projects

The proposal aims at opening of project account in the R&D department which will be used for the allocated budget not only from R&D department but external sources as well. This will facilitate all teams associated with long term projects along with the Institute teams to try their best to attract and bring in sponsorship from firms for their respective projects. A Proposal to Dean Research and Development for the same is already underway.

## ● Newsletter

SnT Council will publish its first newsletter after Takneek. Based on the success of the first newsletter and financial condition of the council, second and third editions of the newsletter may be published in November and March respectively.

## ● Tools and Components Store

The council will preserve all the components bought by the pools during Takneek from Gymkhana fund. These components may be claimed by the pools prior to next Takneek. From the previous two years, the components that are bought are not preserved and funds for the year next are used to buy the same products. This policy will put a cap on this wastage.

## ● Tinkering Lab

Science and Technology Council will conduct workshops in Tinkering Lab. We plan to have a series during the Summers and another one during next semester before Winters. This will help students familiarise themselves with the machines that the institute has provided for manufacturing and fabrication of projects. Right now we face some problems due to restricted timings of the lab. Once students will get familiarized they may use it on their own any time.

## ● Inventory Management

For the first time in SnT Council, inventory of each and every club and hobby group will be made public through council's website. Such measures have already been taken by Electronics Club to make it easy for the campus junta to search for the components and get them issued from the club.

## ● Outreach to PGs

To increase participation of post-graduates in the council activities, we are trying to include them in the council's core team. Already one club coordinator and one hobby group leader is a postgraduate student. Council will also try to include some events in Takneek exclusively for post graduates to increase their participation. As always lectures and workshops will be open to all, to make sure that post graduates attend them. We will start wing publicity in PG Halls similar to what we do in UG Halls.