“You have to dream before your dreams come true” -APJ Abdul Kalam

It took me immense courage to choose the satisfaction and dream over stability. I am not saying it will be right for everyone, but it is a decision purely based on your priority. Do not consider anybody’s opinion beyond a certain extent because you are the one wearing your shoes.

Indian Space Research Organisation (ISRO), Bhabha Atomic Research Centre (BARC) and Defence Research and Development Organisation (DRDO) are the three-premier research-based organisations of India. It will be a great privilege to work for these organisations and ultimately serve for the country.

I got a chance to work in a lab of DRDO as a trainee. How I got DRDO for training, is itself an interesting story, and I am going to tell you in brief because journey matters more than the goal, Right? I always wanted to be in a field of research (As my childhood dream was to be a Scientist, but at that time I believed Scientist do only experiments, the chemical experiments :p)

I will divide my whole journey into three parts. Firstly, I will tell you about my experience and some basic facilities about IRDE (the lab of DRDO). Secondly, I will tell you about my work and how I managed things and lastly I will tell you about the procedure for applying as an intern/trainee and how I got this chance. I am writing about the first day experience before the procedures to get there.

बलस्य मूलं विज्ञानम्
"Strength's Origin is in Knowledge"



IRDE, DEHRADUN

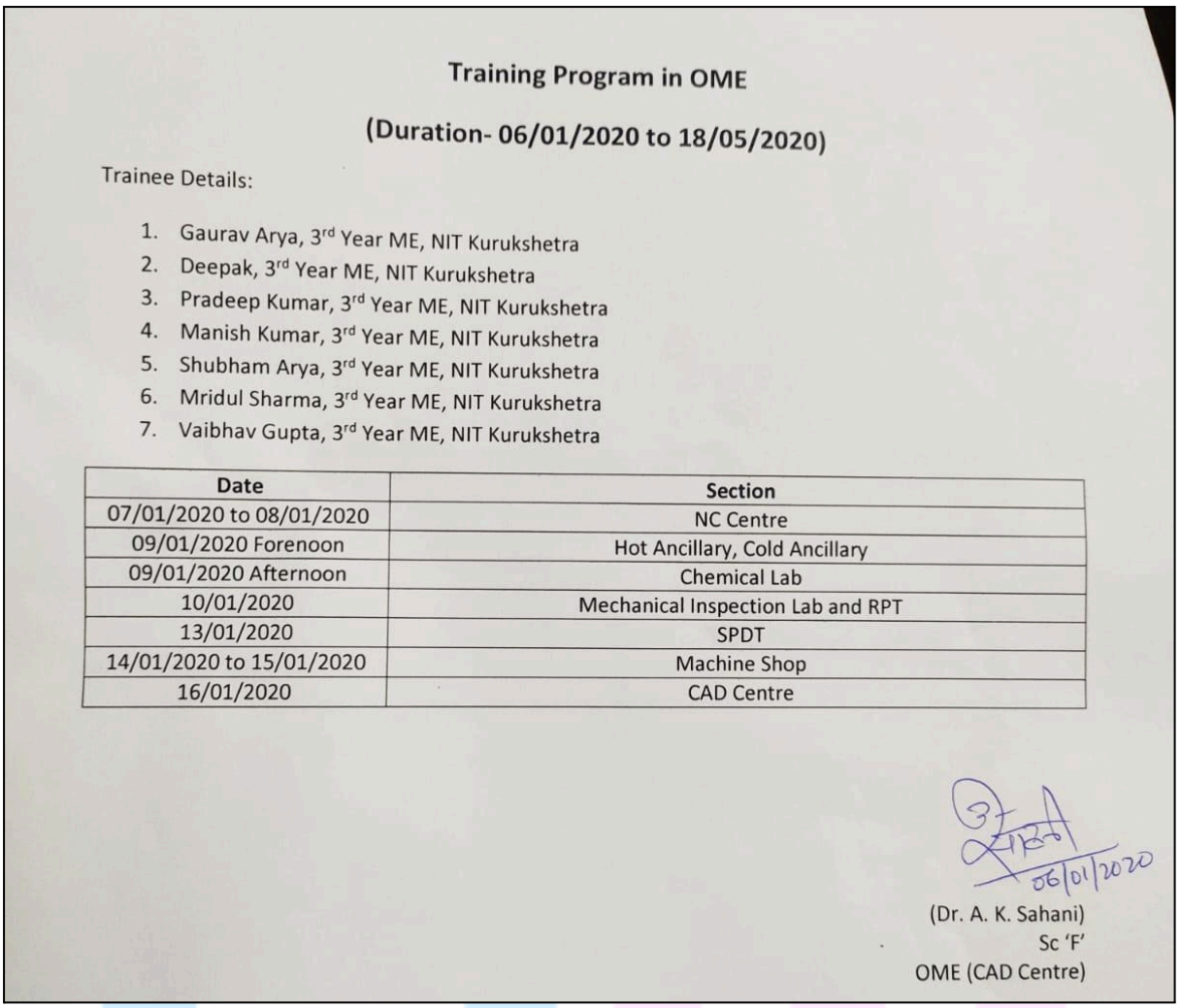
PART ONE

FIRST DAY AT DEHRADUN: I reached Dehradun one day before the training commenced. Me and one of my friends visited the famous "The Ganga Aarti" at Haridwar a day before reaching Dehradun. We took a PG near the lab of DRDO (it is situated outside of Dehradun city so the number of PGs are very less there) and It cost me reasonably with food. **DRDO** does not provide any **accommodation.** You have to stay in the PG of Dehradun and/or eat from the PG you are staying in. (Though it is not necessary, but you will relate, once you will join it)

FIRST DAY AT IRDE: On the next morning (06th of January, 2020), we had breakfast at PG and went to **IRDE (**Instruments Research & Development Establishment), a lab of DRDO. It is located at a hill area of Dehradun, far from main city. After reaching the main gate of the lab, the guards checked us & our bags and asked us to deposit our cellphones at the counter and get the tokens. (You will not carry any type of electronic items inside the lab due to security reasons). Also, the officials gave us a form which was to be filled to get the visitor pass which is mandatory for everyone who wants to go inside. After that we went to the HR division, where our documents and Police Certificate (PC) were verified by the HR officer. (In DRDO, they are very strict about the police verification certificate so If you do not have any other document except PC then they will give you time to submit it). After this, he took all of us to a senior scientist of OME department (Opto-Mechanical Engg.). Then a tentative one-week schedule is prepared for our orientation program and visit to different labs of OME. (After 3-4 days of orientation program, we were called by the Director of IRDE, we had a warm greeting and he told to his team, just do not limit these students to only OME, we have different departments, they should explore that interdisciplinary department too and our orientation program extended to 15 days.) On the same day in the evening, we got our ID cards and passes.

ORIENTATION PROGRAM: As aforementioned, when we reached the lab, we reported to the HR section and submitted our relevant documents. After that we went to office of a senior scientist (Scientist 'F') in OME department. [Do not worry if you are not aware of categorization of scientist rank at this stage, I will discuss it in the last section of part 1]. An assistant scientist prepared a schedule for visiting the different sub-department of OME from Jan 6 to Jan 16. Luckily, I have the snap of that time table and will attach with this document. The main labs are *Mechanical Inspection lab, Testing lab, NC centre, CAD centre and Machine shop* etc. During orientation, a final year student of JECRC Jaipur also joined us. After 3-4 days, we were called by the director and he extended our orientation to all the departments of IRDE, as I mentioned before. During our orientation program, we spent our remaining time in the central library of IRDE after visiting the respective lab. The library cum computer centre was quite modernized and contains books mostly related to optics. The main departments which we visited are as follows:

1. Opto-Mechanical Engg. Systems (OME)
2. Servo Department
3. Air-Borne Systems (ABS)
4. Fire Control System (FCS)
5. Thermal Imaging (TI) Department
6. Vision and Instrumentation (VI)
7. Naval System
8. Advanced System Group



Training Program in OME

(Duration- 06/01/2020 to 18/05/2020)

Trainee Details:

1. Gaurav Arya, 3rd Year ME, NIT Kurukshetra
2. Deepak, 3rd Year ME, NIT Kurukshetra
3. Pradeep Kumar, 3rd Year ME, NIT Kurukshetra
4. Manish Kumar, 3rd Year ME, NIT Kurukshetra
5. Shubham Arya, 3rd Year ME, NIT Kurukshetra
6. Mridul Sharma, 3rd Year ME, NIT Kurukshetra
7. Vaibhav Gupta, 3rd Year ME, NIT Kurukshetra

Date	Section
07/01/2020 to 08/01/2020	NC Centre
09/01/2020 Forenoon	Hot Ancillary, Cold Ancillary
09/01/2020 Afternoon	Chemical Lab
10/01/2020	Mechanical Inspection Lab and RPT
13/01/2020	SPDT
14/01/2020 to 15/01/2020	Machine Shop
16/01/2020	CAD Centre

06/01/2020

(Dr. A. K. Sahani)
Sc 'F'
OME (CAD Centre)

ORIENTATION SCHEDULE OF DIFFERENT LABS OF OME

TIME TO GO MY DEPARTMENT: After visiting the different departments and labs for the initial 15 days, we were again called to the HR office. Now, we were given our departments for our project work depending upon the project requirement and vacancies. Me and one of my friends were given the ABS i.e., Air-Borne Systems. (In layman terms the department deals with instruments designed to operate in air). Then, we went to the office of the Head of ABS who was Scientist 'G'. She briefed us about the department, work and her expectations from us. Then she called a technical assistant and he took us to a Scientist 'E', who was head of the Mechanical Components Division. They dealt with the mechanical design of components used in ABS. The lab was well equipped and well organised. There were a total 3 Scientists (Sc 'E', 'D' & 'B') and 1 Technical Assistant who worked for the lab. Sc 'D' & 'B' interacted with us and told us about how to choose a project and what their work was. They allocated a system (PC) for us and we were supposed to save all our work to that system. [Actually, the internees were not supposed to be included in a live/ongoing project so we have to select our project by ourselves.]

CANTEEN AND CAFETERIA: As we went to the lab in the morning and came back to PG in the evening, it is obvious that we took our lunch and snacks at IRDE itself. There was a central canteen which offered us lunch for a very low price. There was a short procedure to book a lunch: the lunch timings were 12:30 PM to 2:00 PM, so we had to book our lunch before 11:00 AM. They did this because some people came after lunch and they have a rough idea how many people will come so that the wastage of food can be minimized. The items in lunch changed everyday and the food was decent

and good. There was a different dining facility for scientists and guests. I was not getting a chance to visit that facility but some of my friends visited and took lunch (paid by themselves). The arrangements were the same as a 5-star restaurant and the taste was awesome as well as more variety than normal canteen services. Being a scientist has its own perks :p

SPORTS FACILITIES: Normally a person thinks that being a scientist means you have to work all the time. I also had the same views but after coming here, this assumption changed. There was a separate sports hall where normally 3 to 4 indoor games are played i.e. Table-tennis, Chess, Carrom-board etc. The sports hall was opened during lunch time only. There were some people who have played at Inter labs competitions. In the month of January, the annual day of IRDE is celebrated with great joy and happiness. During the annual day function, different activities like sports (cricket, football, TT), singing and other cultural events take place. The sports room is open all the time on that day. I was fortunate enough to watch the celebration of the annual day of IRDE.

LIFE OF A SCIENTIST: I might not be the right person to answer this question but I will definitely tell you something useful: what I observed, what I think about the scientists and what I feel. In this section I will also describe to you the hierarchy of the organisation and some good points which I learnt from them. Generally, the timings are 9 to 5 but you can work till you want. The scientists usually do their assigned task and attend meetings organised by the intra and inter-department. There are different posts of Scientists, such as Sc B,C,D… and they get promotions every 3-4 years on the basis of recommendations and interviews. The fresher scientist is of category ‘B’ and their position of responsibility and pay scale increases with alphabetic order. For joining DRDO as a Sc ‘B’, you have to appear in the examination which is conducted by RAC, DRDO after the B.Tech. All the departments work in collaboration and develop the product. Different design parts are modelled in different groups of different departments and manufactured & assembled by central workshop and testing labs. Besides the lab, there is a DRDO colony where scientists live with their families. All the necessary things are available in their colony market mall with subsidized prices for them. The environment of the colony is very calm and situated in a hill type area. Gardens and temples are also there which make the place so attractive. I also got to know that if a scientist wants to pursue higher studies, there is a provision of doing masters/doctorate in some top institutes of the country under some conditions.

PART TWO

MY WORKs & RESPONSIBILITIES: After assigning the departments, we were three students in the ABS group. Two of them were from the same college, the other one was from Jaipur. Initially, there was no work for us, only orientation of that group happened. After that we got our first task in which we had to implement some basic concepts of engineering in SOLIDWORKS (Designing software).

Generally, there are three kinds of work:

1. Lab work that I can not disclose (since i signed a Non-Disclosure Agreement)
2. Skill learning work which I use in my project (The daily task which I was being assigned)
3. Project work for my college which I can show here

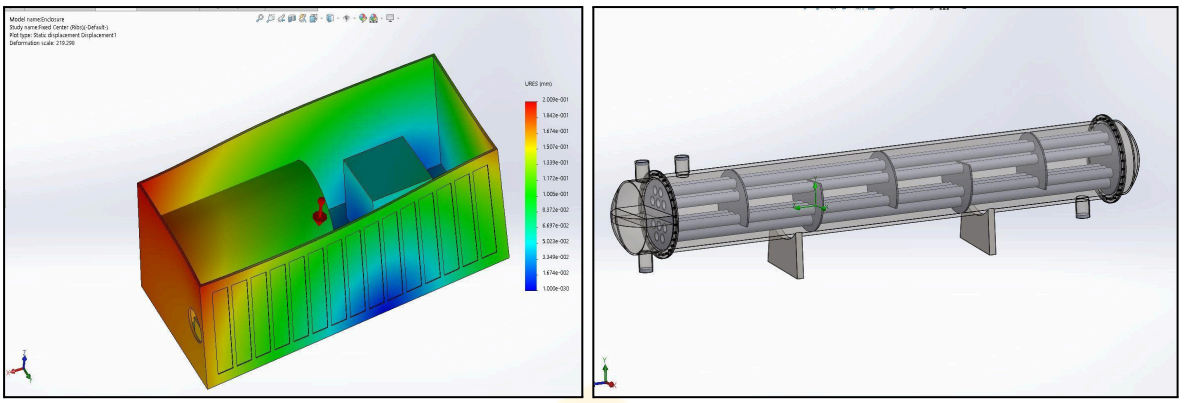
In this article, I will tell you only about the third type of work since I am not supposed to share the first kind of work publicly.

DETAILS OF MY PROJECT WORK: The projects undertaken by me during the semester were- 'Design and Static Analysis of Enclosure' and 'CFD Analysis of Heat Exchanger'.

Initial phase of the training helped me to get used to the organization work culture and made a visit to different labs which helped me widen my practical understanding of the Inspection process. The project started with code validation of the software by using different pre-solved analytical problems of cantilever and comparing the simulation result with analytical data. I also used some other problems for next level code validation, this not only increased my learning in the research field but also helped me to enhance my skills in softwares like SOLIDWORKS, Simulation (FEM) etc.

After that, I designed an Enclosure which contains different payloads and performed its Static Analysis. Its optimization is done using an iterative method. After performing optimization, I converged the result using h and p-type of convergence. I used iteration considering the enclosure has the least mass with least deflection. Certain new findings were produced and thus levelled my work to a good height in research.

At the terminal phase of my training, I did a project regarding CFD Analysis of STHX using Flow Simulation (SOLIDWORKS). For doing my analysis I considered the literature review of 'Comparison of Shell and Tube Heat Exchanger using Theoretical Methods, HTRI, ASPEN and SOLIDWORKS simulation softwares'. The major finding of this project is to understand how tube passes and the mass flow of fluid at shell side changes the heat transfer rate. Overall, the project semester helped me to get an overview of research carried out in this prestigious lab of DRDO.



ENCLOSURE AND SHELL AND TUBE HEAT EXCHANGER 3D GEOMETRY

DIFFICULTIES IN PROJECT & HOW I MANAGED: My project work was going at a normal pace till mid march of 2020. Me and my friends had gone home for holi and came to hear that COVID-19 was spreading rapidly in india. The same day at which I returned to dehradun, I had to go home again in the evening since in our lab, 2 scientists got infected to COVID. We had been given a week leave officially by the lab. At that time, I was unaware that this would be my last time to visit my lab and then lockdown started. I was waiting to lift the lockdown, but since cases are not decreasing so it would not lift up. My last date of training was coming near so I decided to finish the remaining project work remotely. But the main problem was the models which I had created, were in the lab's system and nobody could bring these files to other places. This was the most panicked moment for me. After discussing with my mentor, I decided to create that model again with some assumptions. I somehow managed to complete my project within the timeframe and was able to submit the report & able to present it in college. That time I realised that we are capable of doing things smoothly, if we do not panic and stay ourselves cool at that moment. I learnt this lesson and am following it.

RETURNING TO DEHRADUN: My training had completed by mid may and I had submitted my reports too in college. But the certificate from the lab is still pending. The main reason was we had a security pass from the lab and without returning it we could not get the certificates. So, I went to Dehradun after 5 months when the situation became a bit comfortable. First I reached my PG, collected my bags and suitcase and then went to the lab where after returning my ID card, they gave me a project completion certificate. It has a stamp of the R & D sector, Government of India, which is enough to give me goosebumps at the time and after whenever I see it.

I have started the writing by a quote of Abdul Kalam sir and end this journey by again his quote. **B**ut wait, this document is not completed yet, there is still a *Part 3* left for those who want to pursue his/her dream by doing training/internship in DRDO or some other R&D centers of the country (The procedure is also similar).

"Never stop fighting until you arrive at your destined place - that is, the unique you. Have an aim in life, continuously acquire knowledge, work hard, and have perseverance to realise the great life." -APJ Abdul Kalam

PART THREE

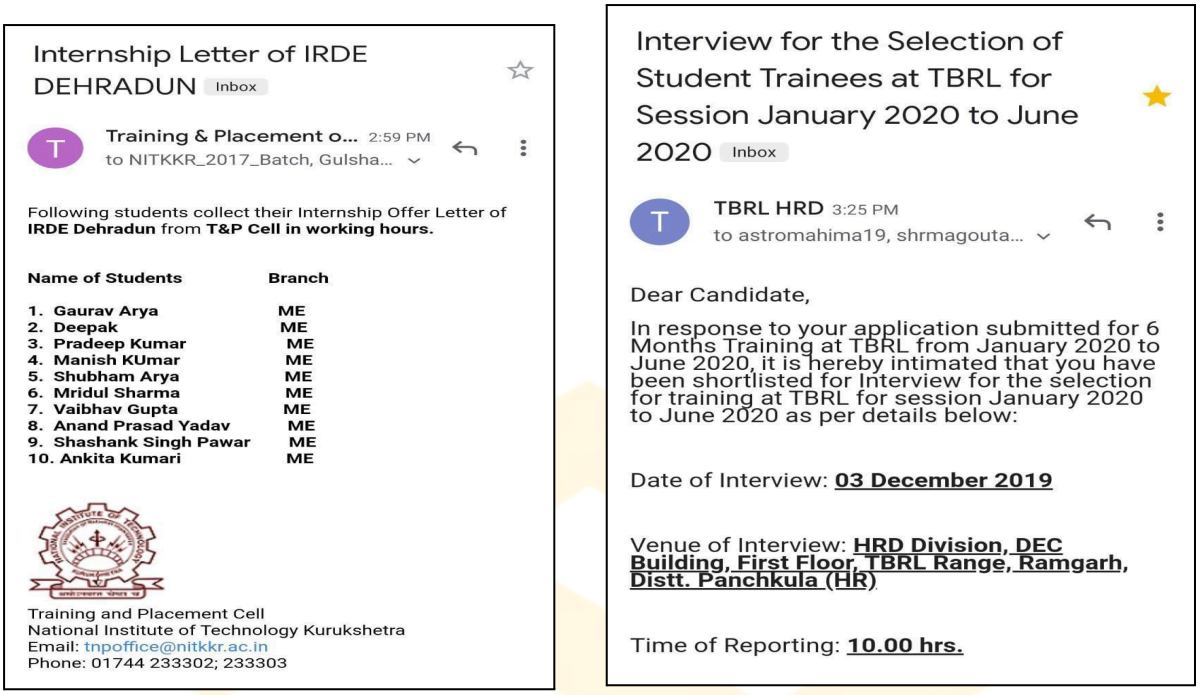
Ok, so now the wait is over. I will tell you about the procedure of getting an internship in DRDO. I will discuss the things as usual with my story. The procedure written is may/may not be unique, some part is just the procedure which everyone follows but some part is unique.

HOW IT IS STARTED: In my college, there is a provision of doing a semester training in 6th semester (Actually this semester training thing was started from my batch) and for this, many companies had started to come in 5th semester. I had made up my mind not to join non-core and core companies (yes, you have heard right!). So then what did I join? Initially I thought of doing some project in some IITs or IISc but I have not known the exact procedure. I just applied through the Indian Academy of Sciences (IAS) but they were providing an internship only for two months (Also I was not selected for this).

I, along with some of my friends, decided to send mail for training to DRDO labs. I have heard that some of my seniors have done their internships in DRDO labs so we decided to contact them and ask them about it. After discussing with seniors, we decided to go to a professor who can recommend us. But when we met him, he told us that it is a very long process so if someone from DRDO itself recommends us then it will take less time (From that time I got to know about reference things). The professor suggested we should go to director sir since he is an ex-DRDO scientist. It seems easy to meet director sir but in reality it is not. Only me and my friends know how we manage to meet him and hand over our resume and documents to him.

PATIENCE MEANS SELF-SUFFERING? : As we have sent our document physically to TBRL, Chandigarh (A lab of DRDO) and it is common to wait for their reply. But 'till when we have to wait' was uncertain. We regularly went to the director's office since we had really no idea till when we would get some reply (may be negative ;_;). Actually I did not want to miss the DRDO training by any chance so I also mailed 12-15 different labs of DRDO. Someone suggested to me not to Ctrl + C and Ctrl + V to every place so I changed the content a little according to the lab's work. The same person also told me to make the subject of mail catchy since 80% of mail is ignored by reading the subject only. Since it needs patience, I was waiting for the reply.

In an email along with a brief Statement of Purpose (SOP), *I attached the drive links for resume, marksheets, character certificate and No Objection Certificate (NOC).* After 10 days, I also followed up to each lab separately. But during mailing, I made a blunder (which obviously I got to know after joining my lab in January 2020). I had mailed to the director of every lab, instead of that I should have mailed to the HR division of every lab. Nevertheless I got replies from two labs only in the end and that was negative.



Internship Letter of IRDE DEHRADUN Inbox

Training & Placement o... 2:59 PM
to NITKKR_2017_Batch, Gulsha...

Following students collect their Internship Offer Letter of **IRDE Dehradun** from **T&P Cell in working hours.**

Name of Students	Branch
1. Gaurav Arya	ME
2. Deepak	ME
3. Pradeep Kumar	ME
4. Manish KUmar	ME
5. Shubham Arya	ME
6. Mridul Sharma	ME
7. Vaibhav Gupta	ME
8. Anand Prasad Yadav	ME
9. Shashank Singh Pawar	ME
10. Ankita Kumari	ME

Training and Placement Cell
National Institute of Technology Kurukshetra
Email: tnpoffice@nitkkr.ac.in
Phone: 01744 233302; 233303

Interview for the Selection of Student Trainees at TBRL for Session January 2020 to June 2020 Inbox

TBRL HRD 3:25 PM
to astromahima19, shrmagouta...

Dear Candidate,

In response to your application submitted for 6 Months Training at TBRL from January 2020 to June 2020, it is hereby intimated that you have been shortlisted for Interview for the selection for training at TBRL for session January 2020 to June 2020 as per details below:

Date of Interview: **03 December 2019**

Venue of Interview: **HRD Division, DEC Building, First Floor, TBRL Range, Ramgarh, Distt. Panchkula (HR)**

Time of Reporting: **10.00 hrs.**

EMAILS OF DIFFERENT LABS OF DRDO FOR TRAINING PURPOSE

THE TWIST IN THE STORY: As we were waiting for the reply, in meantime a mail popped up in our inbox. A mail from Training and Placement Cell (Tnp), where it is written that some of DRDO labs are interested for a semester training in this year. We were also surprised since it had never happened before that so many labs come for internships. We just filled the google form and contacted the TnP cell about the selection method. After sometime it was cleared that shortlisting will be done by CGPA till last semester. In google form, we had to choose two labs so I chose IRDE Dehradun and TBRL Chandigarh. But within a week, we (the persons which sent the application to DRDO lab earlier) were called by the Head of TnP cell and they asked us not to go for internship by unofficial manner (via director sir reference) so we decided to go by official channel. But the process lasted till December and in the meantime many DRDO labs including Brahmos cancelled the recruiting drive due to security reasons. In the end month of the year, we received an email in our inbox which contained the offer letter and police verification form. After getting a police certificate (Luckily, I got it on time otherwise my joining would be late.) In the meanwhile, we also got the interview call from TBRL Chandigarh but since we made it to IRDE Dehradun we did not go for the interview. After this, we discussed for our next move (like transportation, PGs etc.) After this all the things are written in Part one, go and check it out (if you have not read it before).

WANT TO TIME TRAVEL! : Yes, you read correctly and why I want to time travel because it has been around 3 years since I completed my internship. As the time progresses, you will learn some new things and if you add/modify it to your past work that is called Updation. Now, I have a more clear understanding about these things so I want to go back in time and make some corrections. But I can not do that :(

So if I conclude what I have learnt from that is, when you have no prior experience, no guides, and no reliable information, then you have to walk each and every road and then you will find your correct path (Sometimes, you will have to create a new path). We do have plenty of resources and guides all over the internet now-a-days, but finding the right one for you is always challenging so *my advice is to create your own maps after getting sufficient information*. You would not know what you want to

be when you grow up –and that is fine! But when you achieve it, don't forget how badly you once wanted what you have now.

HOW TO APPLY (STEPS TO FOLLOW):

1. Students who are interested in doing an internship or getting training projects, have to send an email of the application along with their updated resume to the respective department of DRDO. Then they need to wait for the reply from the respective department.
2. If their profile matches with the requirement of the internship program, students will be informed directly through the mail.
3. Once, the student has got selected for the internship/training, they will be receiving mail from the respective department where the interview schedule will be given.
4. Along with the interview details, they will be informed of important instructions regarding the mandatory documents, which students have to bring for verification.
5. Once the students have cleared the interview, they will go through the document verification and will be allotted the venue and date of the internship.
6. Students are required to select their field of interest at the DRDO to start internship or project training.

   This section I copy pasted from https://www.aplustopper.com/drdo-internship/ [You can find contact details of different labs easily]

You can find some details of internship here (DRDO Site):

[1] click here

[2] click here



दूरभाष/ Phones : 0135-2787004 to 2787007
फैक्स/ Fax : 0091-135 2787161 &
2787128
तार / Telegrams : IRDE
सभी पत्राचार निदेशक को ही सम्बोधित होने चाहिये, किसी वैज्ञानिक/अधिकारी के नाम से नहीं।

ISO 9001:2000

भारत सरकार, रक्षा मंत्रालय
रक्षा अनुसंधान तथा विकास संगठन
यंत्र अनुसंधान एवं विकास संस्थान
रायपुर रोड, देहरादून - 248008
GOVT. OF INDIA, MINISTRY OF DEFENCE
DEFENCE R & D ORGANISATION
INSTRUMENTS R & D ESTABLISHMENT
RAIPUR ROAD, DEHRADUN - 248 008

पत्रांक / Letter No.: 47617/ टीसी/3173 1 दिनाँक/ Dated:24/12/2019

सेवा में,

TRAINING & PLACEMENT CO-ORDINATOR
NIT KURUKSHETRA
KURUKSHETRA-136119

विषय : आई.आर.डी.ई. में विद्यार्थियों को प्रशिक्षण सुविधा

VAIBHAV GUPTA, B.TECH 3 Year, ME को इस संस्थान में 22 सप्ताह अवधि का प्रयोगात्मक प्रशिक्षण / परियोजना कार्य करने की सुविधा दी जा सकती है ।

इस संस्थान में प्रशिक्षण परियोजना कार्य प्रारम्भ करने से पूर्व विद्यार्थियों को अपने चरित्र एवं पूर्ववृत्त का पुलिस प्राधिकारी से सत्यापन कराना आवश्यक है । इसके लिये निर्धारित फार्म, एक वचनबंध के साथ पूर्ण कर वापस करने के लिये यहाँ संलग्न किया जा रहा है । चरित्र सत्यापन के बिना, प्रशिक्षण दिया जाना सम्भव न हो पायेगा ।

कृपया, छात्र / छात्रा को यह भी सलाह दें कि, वे प्रशिक्षण के लिये आते समय अपने 02 नवीनतम पासपोर्ट आकार के फोटोग्राफ भी साथ लाएँ । ।प्रशिक्षण अवधि में आवास की सुविधा नही दी जा सकती है, अतः रहने का प्रबन्ध स्वयं करें।

संलग्न :

1. विद्यार्थी द्वारा घोषणा पत्र
2. कॉलेज द्वारा प्रमाण पत्र
3. पुलिस प्राधिकारी द्वारा चरित्र प्रमाण पत्र

(Vaibhav Gupta)
Technical Officer 'B'
कृते निदेशक

सर्व शिक्षा अभियान
राजभाषा की रक्षा, देश की सुरक्षा
Training Management System

7 / 10

OFFER LETTER OF IRDE, DEHRADUN

CLOSING STATEMENT

All over the years I have understood one thing that thinking all the time and then doing is less efficient than doing and thinking parallelly. The memory of people is dynamic, they will say something and will forget so do not take such conversation seriously. Just listen to your parents and yourself and it would be enough, also I know we have to compromise many times (due to financial issues, family problems etc), but trust me whenever the situation gets stable/better, at least try all the things which you wanted to do from childhood.

Also I want to point out one thing during my internship period, I discovered something which makes me feel super cool; Travelling and Exploring new places. So it means you can always find some unexpected activities during your journey.

And believe me I have got many failures and rejections so whenever I get demotivated, a quote comes to me everytime: "Whenever you feel like giving up, just remember why you started and how much you have come through". Also sometimes, it is not necessary to know everything at the current time step, you will have a clear idea in future of why you had done that.

If you are reading this paragraph then I can assume you have read the whole article. I am done with the writeup and will try to modify/add in future, if there is some misinterpretation. I request you to please write your views about the article so that I will understand better in what sense I have to improve. You can write to me by email: vaibhav19m345@gmail.com or any of the social media accounts listed in informals.

Thanks for Reading and ignore the grammatical errors (If any).
Stay Original!

Informals: My instagram ID actually is a time machine for me because whenever I go through my profile, I reach that particular day of memory when it was clicked. That's why I have arranged my ID in a special way. You can also see some of the moments of this journey by just clicking the following links.

1. Initial Phase
2. Middle Phase
3. The Final Showdown

You can find my social media here: Click here to connect