

# Internship Guide

Your seniors from IIT Delhi

15th March,2024

## Acknowledgements

This initiative was taken by Anirudh Garg, who identified the need of guidance for second-year students during the internship preparation.

We extend our heartfelt gratitude to all individuals who contributed to this guide, including Deepanshu Rohilla, Manas Jain, Sarthak Srivastva, T Pratham, Aditya Singh, Samir Sharma, Siddharth Gupta, Angad Shrivastava, Aniruddha Deb, Abhay Yadav, Yashvardhan Patil, Pramsu Shrivastava, Rachit Gupta, Samyak Gothi, Udit Batish, Somaditya Singh, Geetigya Joshi, and Sankalp Swarup. Their invaluable insights, expertise, and collective efforts have enriched this document and will undoubtedly benefit countless students in their internship endeavors.

Together, we aim to foster a culture of mentorship and collaboration, empowering students to navigate their academic and professional journeys with confidence and success.

## About the Doc

An internship is a key part of figuring out your career path, especially for students in their second year who are moving into their third year. It opens the door to real-world experience in the field, giving people important views into working life and helping them improve their skills. A good internship can also improve your confidence a great deal and open the door to future chances, such as getting a PPO and having an upper hand during placements.

We saw that students didn't have a lot of complete guidance before their internship, even though we knew how important internships were to their academic careers. There are some people who can get help from seniors with a lot of knowledge, but not everyone can. It became clear that the experiences of many students needed to be put together to make a complete guide for internship season.

This small guide is not official or backed by any organization. Instead, it is a group effort by seniors to help and guide their junior peers. We have put together information, tactics, and tips to help students with their internships by using the knowledge of some of the smartest people around.

As you start, keep in mind that this paper is not a strict instruction manual. Instead, it is a roadmap made from the experiences of your seniors. We hope that by sharing our thoughts and lessons learned, we can give you the tools you need to make smart choices and start a satisfying internship.

We hope this small guide helps you as you prepare for your internship.

# Contents

<b>1</b>	<b>General Tips</b>	<b>6</b>
<b>2</b>	<b>Quant</b>	<b>7</b>
2.1	What is needed for this role? . . . . .	7
2.2	What resources should I use for this role? . . . . .	7
2.3	What is to be written in the CV with particular focus? . . . . .	7
2.4	In the 4th semester, what should I do in the April-July period for the preparation of intern? . . . . .	7
2.5	Any other tips . . . . .	8
<b>3</b>	<b>Software Developer Engineering (SDE) - HFT focus</b>	<b>9</b>
3.1	What is needed for this role? . . . . .	9
3.2	What resources should I use for this role? . . . . .	9
3.3	What is to be written in the CV with particular focus? . . . . .	9
3.4	In the 4th semester, what should I do in the April-July period for the preparation of intern? . . . . .	10
3.5	Any other tips . . . . .	10
<b>4</b>	<b>Software Developer Engineering (SDE) - Pure SDE</b>	<b>11</b>
4.1	What is needed for this role? . . . . .	11
4.2	What resources should I use for this role? . . . . .	11
4.2.1	Part A . . . . .	11
4.2.2	Part B . . . . .	11
4.3	What is to be written in the CV with particular focus? . . . . .	12
4.4	In the 4th semester, what should I do in the April-July period? . . . . .	12
<b>5</b>	<b>Analytics</b>	<b>13</b>
5.1	What is needed for this role? . . . . .	13
5.2	What resources should I use for this role? . . . . .	13

5.3	What is to be written in the CV with a particular focus? . . . . .	13
5.4	In the 4th semester, what should I do in the April-July period to prepare for intern tests? . . . . .	13
5.5	Any other tips . . . . .	14
<b>6</b>	<b>Consult</b>	<b>15</b>
6.1	What is needed for this role? . . . . .	15
6.2	In the 4th semester, what should I do in the April-July period to prepare for the internship? . . . . .	15
6.3	What resources should I use for this role? . . . . .	15
6.4	Any other tips . . . . .	16
<b>7</b>	<b>Machine Learning</b>	<b>17</b>
7.1	What is needed for this role? . . . . .	17
7.2	What resources should I use for this role? . . . . .	17
7.3	What is to be written in the CV with particular focus? . . . . .	17
7.4	In the 4th semester, what should I do in the April-July period for the preparation of intern? . . . . .	17
<b>8</b>	<b>Core (Electrical)</b>	<b>18</b>
8.1	What is needed for this role? . . . . .	18
8.2	What resources should I use for this role? . . . . .	18
8.3	What is to be written in the CV with particular focus? . . . . .	18
8.4	In the 4th semester, what should I do in the April-July period for the preparation of intern? . . . . .	18
<b>9</b>	<b>Core (Mechanical)</b>	<b>19</b>
9.1	What is needed for this role? . . . . .	19
9.2	What resources should I use for this role? . . . . .	19
9.3	What is to be written in the CV with particular focus? . . . . .	19
9.4	In the 4th semester, what should I do in the April-July period for the preparation of intern? . . . . .	19
9.5	Any other tips . . . . .	19
<b>10</b>	<b>Research</b>	<b>20</b>
10.1	What is needed for this role? . . . . .	20
10.2	What resources should I use for this role? . . . . .	20
10.3	What is to be written in the CV with particular focus? . . . . .	21
10.4	In the 4th semester, what should I do in the April-July period for the preparation of intern? . . . . .	21
10.5	Any other tips . . . . .	21

# Chapter 1

## General Tips

1. **Have a goal in mind always**; whether it may be two of them or three of them; and align your campus/life activities around that goal. Always keep in mind what will benefit you for your goal and then only plan it.
2. **CV making:**
  - a. Highlight numbers in the CV, make them bold.
  - b. Avoid white spaces, photo with white background.
  - c. Don't work in number of Projects, internships; rather work on quality project.
  - d. Always get your CV proofread by number of seniors for the inputs which help in making CV better.
  - e. Rapport: Message seniors on LinkedIn for internship, show your intent.
3. **CG is very important**; CG is the one & the only criteria through which a shortlist can be ensured. You can try doing easy HULs and OC courses like RDL, ASL to increase the CG.
4. For guys aiming for Startup:
  - a. Good to work initially and find a space and experience there.
  - b. Try to save money from the job and then start.
  - c. It's good to take a job, get the experience but remember to have an open mind.
5. One of the most important things is to **choose your seniors wisely**. Seniors are the ones who help in deciding your trajectory, whether it may be getting an internship, guidance in courses and also personal life problems.
6. **Be away from substance use**. Substance use may feel as if tried once will not harm, but it's a start of a never-ending cycle which will eventually destroy your life for temporary pleasure.
7. Try to **avoid campus politics** as it is not worth it and can harm your academics a great deal.
8. Work on overall personality; you have come to build it and evolve yourself. Try getting involved in one of the things like sports or cultural activities.
9. In case you have a low CG, apply to the maximum companies with the most chance for you and don't be reluctant to sit in Phase-2.
10. You have come to campus to enjoy your life so make friends and enjoy the life. The experience you will have here will be the best time of your life; make sure you have the best of it in every aspect of your life.

# Chapter 2

## Quant

### 2.1 What is needed for this role?

1. Branch - CS, MT, EE for Indian HFTs
2. Courses - COL106, MTL106 important
3. PORs - Will not help
4. CG - 8.5+ (companies like Quadeye/Graviton require 9.2+ CG)
5. Intern Skills - (Not specified)
6. Other specific requirements - (Not specified)

### 2.2 What resources should I use for this role?

1. Websites for maths and probability puzzles:
  - Brainstellar
  - Puzzledquant
  - Quantguide
2. Books for probability puzzles:
  - 50 challenging problems in probability
  - A practical guide to quantitative finance interviews
3. Aniruddha (Optiver Placement): Repo (<https://github.com/Aniruddha-Deb/quant-prep>) is a website dedicated to resources used by him for Quant preparation. (Worth mentioning: Aniruddha is one of the most intelligent person in 2020 entry batch with shortlist in most of the quant companies and placed in Optiver)

### 2.3 What is to be written in the CV with particular focus?

1. Shortlisting for interviews will be done solely based on online tests.
2. During the interview CV projects can be discussed and asked for.
3. ML related project is bonus (but they are not to be done additionally; if you have done them till now (March); then it's fine else can leave it)

### 2.4 In the 4th semester, what should I do in the April-July period for the preparation of intern?

1. Practice maths and probability puzzles regularly, & Codeforces CP problems.
2. For Indian HFTs you must have good CP skills.
3. Attempt Codeforces contests regularly.
4. Try to boost CGPA as much as possible.

## 2.5 Any other tips

You can ask friends to take mock interviews especially for puzzle problems, since clear and frequent communication while solving problems is key in quant interviews.



## Chapter 3

# Software Developer Engineering (SDE) - HFT focus

### 3.1 What is needed for this role?

1. Branch: CS, MnC or EE
2. CGPA: 8+
3. Skills: Basic Mathematical Ability, Logic Building both of which are tested through Competitive Programming

### 3.2 What resources should I use for this role?

1. CP is just like JEE Advanced in the way that there are tons of resources, but the best way to learn is to take a problem and try everything on it, spend hours trying every possible solution until you get it right or you get exhausted. So, enlist on competitive programming sites (mainly Codeforces) and start doing problems. Give contests, upsolve, CP will be the most important thing in your tests and interviews.
2. Apart from this a little Computer Architecture, C++ and OOPS may be asked, the best source for OOPS I've found is the book C++ Primer (freely available online).

### 3.3 What is to be written in the CV with particular focus?

1. Scholastics need to be written well, all the prestigious olympiads (INMO, InPHO, InCHO, InAO), KVPY, and any other olympiads.
2. The mathematics scholastics should be at the top, followed by physics and then chemistry.
3. If you have a scholastic point related to trading or quantitative competitions, put that above the mathematics scholastics.
4. Projects are not that important, however it is important to have one significant project (preferably not a course project) that you can monologue on for at least 5 minutes.
5. Should write your Codeforces rating if it is significantly high (1750+).

### **3.4 In the 4th semester, what should I do in the April-July period for the preparation of intern?**

1. Only and only Competitive Programming
2. Don't waste time on anything else!

### **3.5 Any other tips**

1. Do some interview preparation, keep your confidence high, prepare for HR rounds, have an idea of where your CP skills rank in your batch.
2. Don't fret about your CV and CG, you can't change them now, so no point worrying about it.
3. Most importantly, during the internship tests, stay calm, don't panic, give your best. You may have good skills, but having the right exam temperament will get you a bulk of shortlists, without it, you will make a lot of mistakes under pressure.

## Chapter 4

# Software Developer Engineering (SDE) - Pure SDE

### 4.1 What is needed for this role?

1. Branch - Most companies are open for all branches
2. Courses - COL106 advised to do, COL351 will help
3. Skills - CP is the main and most important. Try to cover OOPs apart from this.
4. Intern - Definitely helps if you have an intern (corporate or research) in CV. Try to get a light internship in the summer. But keep CP as the priority.
5. PORs and ECAs - Not too important for tech roles. One or two of each is fine (just to fill up the CV)

### 4.2 What resources should I use for this role?

#### 4.2.1 Part A

1. This playlist is good for those who have not started CP or are new to it: <https://www.youtube.com/playlist?list=PLauivoElc3ggagradg8Mf0ZreCMmXMmJ->
2. Also, do as much Leetcode as possible. Focus on questions of:
  - Graphs
  - DP
  - Arrays
  - Strings
3. Regularly give contests on Codechef and Codeforces.
4. Avoid solving too many maths or ad hoc problems as they are not asked in company tests/interviews.

#### 4.2.2 Part B

1. Complete striver's sheet completely: <https://takeuforward.org/strivers-a2z-dsa-course/strivers-a2z-dsa-course-sheet-2/>

2. Initial topics (BS, Monotonic Stack, Heap) are important for interviews. DP/ Graphs/ Trees/ Trie for tests. These topics are very interesting so start with these if you know basic cpp containers and stl (Also enable giving tests on LC/CF).
3. Do greedy problems from codeforces.
4. Complete CSES Problemset, solutions available on codeforces blogs.
5. Do additional topics (Kartik Arora, Errichto on YT):
  - Ordered set/ PBDS
  - DP on Trees
  - Binary Lifting
  - Digit DP
6. Move to CP on codeforces regularly (Recommend giving only after doing DP/ Graph from Striver else do LC contests).

Note: Try completing Problem of the day on Leetcode and giving contests every weekend if you are starting 1 sem early.

### **4.3 What is to be written in the CV with particular focus?**

1. Highlight COL106 assignments.
2. Highlight any intern you have done in this field.
3. You should have at least one project in your CV about which you can discuss at length.

### **4.4 In the 4th semester, what should I do in the April-July period?**

1. Only and only Competitive Programming.
2. Don't waste time on anything else!

## Chapter 5

# Analytics

### 5.1 What is needed for this role?

1. A general CG (7+) is good for the shortlisting for the interview round of this role. There are no specific requirements as such.
2. Having done COL106 is a boost as most of the questions are from DSA in both the test and the interview.
3. First two projects written in CV are very important so ensure they are well-written.

### 5.2 What resources should I use for this role?

Before the summers, your primary focus should be learning via Codeforces, with a little focus on LeetCode. You should be able to solve Div 2 problem B comfortably, and problem C should be solved at least once in every 2-3 contests. For DSA, LeetCode problems (around 300 good ones) are decent. Your test will be based on some logical reasoning and probability, so it is good to do at least a medium level of Brainstellar as well.

### 5.3 What is to be written in the CV with a particular focus?

1. Primarily the projects you have made are important.
2. Sometimes the top scholastic achievements are also asked (not much imp).

### 5.4 In the 4th semester, what should I do in the April-July period to prepare for intern tests?

1. In the 4th semester, focus mainly on your CG, give the Codeforces test, and see the tutorials of all the problems you were unable to solve.
2. In the summers, give around 60-40 time to LeetCode and Codeforces.
3. Solve 1-2 Brainstellar problems a day to give your brain a little exercise and practice some basic probability.

## 5.5 Any other tips

The tests mostly have basic questions in MCQ form and then two or three coding questions. Quickly go through the MCQ section so that you have more time for the coding questions. Also, in the interview, most of the questions are based on DSA, so make sure to brush it up before going to the interview.

# Chapter 6

## Consult

### 6.1 What is needed for this role?

1. CG is the most important factor in the CV (Safe: 8+ and Min: 7.5+) and it is advised you prepare for consult once you get the shortlist.
2. 80% of the work is done when you get a shortlist, the rest 20% is comparatively easier to crack given that the competition will be dropped dramatically. This means your CV should be given the utmost priority in this role.
3. Your CV has 4 main parts (equally important):
  - a. Scholastic Achievements: Safe CGPA - 8, NTSE/KVPY, Olympiads, LORs, certifications
  - b. Internships: Try to get at least 2 interns on your CV, with at least 1 of them having a good brand name. Intern period you can write about - 1st year summers, 2nd year winters & 2nd year summers
  - c. PORs: At least one 3rd year POR along with decent PORs in 2nd year
  - d. ECA's: Business case comps (offline/unstop), debating, Intern IIT cult/sport are considered some of the better ECA's.

### 6.2 In the 4th semester, what should I do in the April-July period to prepare for the internship?

1. Focus on securing summer internships during this period.
2. A good brand on your CV always helps, may it be corporate companies like Big 4's, or research schools like Stanford, UNSW etc.
3. Try to not focus on startup interns.

### 6.3 What resources should I use for this role?

1. There is not much you can do to prepare for these roles, although soft skills like communication, time management along with basic hard skills like excel, PPT are appreciated.
2. If you have a good overall profile, in summer try to form case groups of 3-4 people and regularly solve/analyse with them.
3. Famous resources:

- Case Interview Cracked (Book + Youtube Videos)
- SRCC case compendium
- Victor Cheng case videos (Youtube)

## 6.4 Any other tips

1. Consult is more about your overall profile throughout the college which can't be changed within a day or two. Therefore, it is an area where you can't work within a month or two. Finally, work in this area if you have consulted seniors and they tell you it's sure you'll get a shortlist.
2. Don't just focus on consulting as an internship, the area is very tricky and has a major luck factor to it.
3. Only if you have a good overall profile, may you consider focusing on consulting during the summers, or else focus on other profiles as well.



# Chapter 7

## Machine Learning

### 7.1 What is needed for this role?

1. A good CG is needed as it is the deciding factor in the end. Research roles prefer CS students else it is open for all.
2. Most ML jobs demand a good quality project/intern and I would suggest while studying you can parallelly be a part of a project or intern and then explore relevant topics and underlying theory.
3. Courses at IITD for non-CS students in ML are generally not given and also they are too heavy so it is not advised to take them.

### 7.2 What resources should I use for this role?

1. Begin with Coursera courses on ML and Deep Learning or Krish Naik's Machine learning and Deep Learning courses on YouTube.
2. CS229 is also a very good source for theoretical knowledge.
3. Statquest and 3blue1brown are also good channels.
4. Learn about generative AI and LLMs as these are hot topics.

### 7.3 What is to be written in the CV with particular focus?

Good Projects and Intern if any.

### 7.4 In the 4th semester, what should I do in the April-July period for the preparation of intern?

1. Revise your theory and work on DSA as most of them will have a screening test based on it. Some companies also ask to implement basic ML algorithms for a dataset in the coding test and may ask Python only DSA questions.
2. As the number of companies for ML in intern are less, you should focus on other areas of intern as well.

# Chapter 8

## Core (Electrical)

**Note:** Open only for electrical branch (both EE1 and EE3), but some companies open for EP and MT branches as well

### 8.1 What is needed for this role?

1. Digital Profile: ELL201 (Digital Electronics)
2. Analog Profile: ELL202 (Circuit Theory), basic formulae based questions for MOSFET, BJT and Op-Amp.
3. Some questions are also asked from ELL205 (Signals and Systems) and ELL225 (Control Systems).
4. Embedded Profile: C programming, pointer manipulation.

### 8.2 What resources should I use for this role?

1. Theory: Mostly course material covered in classes (courses of IIT), some parts may need to be looked at from the internet (like BJT, Mosfet, etc.).
2. Questions: Should GATE questions.
3. This blog has some good resources, although this is for placements, but may find some good points from here: [https://coreplacementsnsit.blogspot.com/2018/08/hi-i-am-rachit\\_14.html](https://coreplacementsnsit.blogspot.com/2018/08/hi-i-am-rachit_14.html)

### 8.3 What is to be written in the CV with particular focus?

Learn more things and should have crystal clear clarity on the projects with each and every concept in the project used understood.

### 8.4 In the 4th semester, what should I do in the April-July period for the preparation of intern?

Revise Theory, Practice questions for speed, and also practice some aptitude questions.

# Chapter 9

## Core (Mechanical)

### 9.1 What is needed for this role?

1. Focus on core courses of the 3rd and 4th semester (especially APL104 and MCL201).
2. PORs, ECAs, etc. are not required.
3. Good scholastic achievements and high CGPA (8+) are recommended, along with some good core projects (to write in CV).
4. You should have decent communication skills (most of the companies take GD rounds before the interview).

### 9.2 What resources should I use for this role?

You can refer to your course notes only to gain insights and prepare for the tests and interviews.

### 9.3 What is to be written in the CV with particular focus?

Particular attention should be given to scholastic achievements and projects. Try inculcating more core projects, and always proofread your CV with seniors of the same field.

### 9.4 In the 4th semester, what should I do in the April-July period for the preparation of intern?

Revise your courses and practice some interview questions of various core companies. If possible, participate in group discussions.

### 9.5 Any other tips

1. Don't be too harsh on yourself, it's just an intern.
2. Students with a lower CGPA (around 7.5) also get core internships, but the more, the merrier.
3. Focus on your CV, don't make it just for the sake of it.

# Chapter 10

## Research

### 10.1 What is needed for this role?

1. For second-year students, a decently good CG (above 7.5 in most cases), decently good grades in core second-year courses.
2. For third-year students looking for summer internships at the end of the third year, start applying to programs or emailing professors at least 7-8 months before the summers, i.e., the preceding October or November onwards.
3. For first-year students, an interest in trying research projects inside the institute related to their interest. PORs are generally not seen much unless it's a technical club POR related to the field of research. Working in a team is considered a good point, especially for second-year interns.

### 10.2 What resources should I use for this role?

1. Be specific about the subject you want to study/explore and curate a list of possible skills that might help you in the role. Attach a CV and transcript in the emails.
2. Refer to lists of research internship programs such as:
  - <https://github.com/vvignesh17/List-of-all-Research-Internship-Program-for-IIT-and-NITs/blob/master/README.md>
  - [https://docs.google.com/spreadsheets/d/1\\_JAlHirru1cxitm3-Kvek9s\\_znk10f5C2XLG04JRAik/edit?usp=sharing](https://docs.google.com/spreadsheets/d/1_JAlHirru1cxitm3-Kvek9s_znk10f5C2XLG04JRAik/edit?usp=sharing)
3. Explore specific research institutes in India (e.g., IISc, IITs, IISERs, PRL Ahmedabad, RRI Bangalore, TIFR, ICTS, NCRA, IUCAA Pune, ARIES Nainital, HRI Prayagraj, IIA Bangalore, ISRO, DRDO) for summer program deadlines.
4. Email professors in India or abroad for funded/non-funded projects during winters or summers.
5. Seek advice and examples from seniors for CVs, email formats, and SOPs.
6. Consider talking to professors you are working with or doing a project with.

### **10.3 What is to be written in the CV with particular focus?**

1. CV content depends a lot on the field one is applying to, but in general, it should consist of educational background, current interests, research projects, internships, courses done, technical skills, and extracurricular activities or volunteering.
2. Focus more on the technical aspects of projects/internships, awards won, scholarships, conferences/workshops attended, and publications.
3. Seek help from seniors for crafting a compelling CV.

### **10.4 In the 4th semester, what should I do in the April-July period for the preparation of intern?**

Try to get involved in a project either in your institute or elsewhere that seems interesting. Along with working on the project, revise your previous courses and try to explore specific interests.

### **10.5 Any other tips**

Feel free to contact Samyak at 8989007678 for any further details.

**ALL THE BEST**

Hope this Guide helped you