

A decorative graphic on the left side of the slide, consisting of a network of light blue lines and small circles, resembling a circuit board or a stylized tree structure, set against a blue gradient background.

# ECE DEPT. MEET 2021



**HARDWARE**

# COMPANIES AND HIGHER STUDIES - STATISTICS

- **Number of companies** : 8 (It highly depends on the number of people interested in applying for hardware companies).
- **Number of students placed** : Around 10
- **Average Package (considering only hardware roles)** : 21 LPA
- **Number of students who went/planning to go for MS/PhD** : 3

# MAJOR COMPANIES AND THEIR RELATED STREAMS

- **Analog/Digital/RF/Embedded Hardware** : Intel, Texas Instruments, Analog Devices, Qualcomm, Micron, Samsung, Synopsys, SanDisk, AMS, AMD, ST Microelectronics, NXP Semiconductors, Silicon Labs, Western Digital
- **Digital and Embedded Hardware Only** : NVIDIA
- **Signal Processing and Communication**: Qualcomm, MathWorks, Texas Instruments, Samsung, TCS



# MAJOR ENGINEERING ROLES IN COMPANIES

- Systems Engineer-> Design Engineer-> Design Verification Engineer-> Layout Engineer -> DFT Engineer -> Product Validation Engineer
- **Design Verification Engineer** : Hands-on knowledge on CAD Tools (like Cadence Virtuoso), expertise in MS Excel and MS Powerpoint.
- **DFT Engineer** : A very important course called DESIGN FOR TESTABILITY (TB, online lectures available), hands-on knowledge on CAD Tools (like Cadence Virtuoso), expertise in MS Excel and MS Powerpoint.

# MAJOR ENGINEERING ROLES IN COMPANIES

- **Product Validation Engineer** : Hands-on experience on breadboard, printed circuit board, soldering, safety measures and good insights on hardware issues.
- **Systems Engineer** : Deep insights of market value and expectations of a product and system level knowledge of the product.
- **Layout Engineer** : Hands-on experience with CAD tools, good understanding of silicon processes and manufacturing, layout and experience with conventional designs.
- **Design Engineer** : Deep knowledge of designs in the specific fields.

# ONLINE RESOURCES FOR KNOWLEDGE ENHANCEMENT

- There are enormous resources available online from which you can learn a subject yourself.
- The most effective and high-quality online resources are :
  - 1) **MITOpenCourseWare**
  - 2) **edX**
  - 3) **Coursera**
  - 4) **NPTEL**
  - 5) **Nanohub**
  - 6) **Youtube**
  - 7) **iCS group IIT-**

# BASIC COURSES REQUIRED

- **Analog** : Basic Electrical Circuits, Analog Circuits, Analog Systems and Laboratory, Analog IC Design.
- **Signal Processing and Communications** : Probability and Random Variables, Signals and Systems, Linear Algebra, Digital Signal Processing, Digital Communications.
- **Digital (Transistor level)** : Digital Logic and Computer Design, Digital Integrated Circuit Design.



# BASIC COURSES REQUIRED

- **Computer Architecture and Embedded Hardware :**  
Digital System Design, Computer Architecture, FPGA Design for Embedded Systems.
- **RF :** Single and multivariable calculus, electricity and magnetism, electromagnetic theory and applications, signal processing and communication courses, analog courses, principles of semiconductor devices, MOS transistors, RF Integrated Circuits.


# HIGHER STUDIES - PORTUNITIES

- You can have chance for both academia and industry.
- Getting placed as senior engineers for challenging roles.
- High paid (For ex. Avg salary for Senior Analog Design Engineer at TI Germany is around 1.2cr).
- Getting assistant professor roles at many reputed universities in US and Europe ( For ex., avg salary at EPFL, Switzerland is around 1cr).
- International contacts and collaborations



# START?

## HIGHER STUDIES - HOW TO

- Knowledge wise, follow the online resources
  - Make a list of top 30-50 universities (you can refer to QS World Ranking), their research domains, and their H-index.
  - For research interns, target for young professors abroad whose h-index is between 10-20 (try for 6 month interns).
  - Try to be in teams which are having collaborations with foreign universities.
  - Publishing papers at top-tier conferences (sometimes a single paper is sufficient)
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SOFTWARE



# INTRO

- Highest number of companies in intern AND placement drive.
- Decent compensation (12-15 LPA avg. base).
- Large support group given IIT's coding culture.

# HOW TO PREPARE : CODING & DSA

- Codeforces (Div. 2 c-d level).
- Interviewbit (organized).
- Leetcode (great discussion section).
- GFG (company-wise prep and the go-to site for everything else).
- Hackerrank, Hackerearth (most coding rounds are conducted here).
- Others include Codechef, SPOJ etc.
- Academic courses on DSA.

# HOW TO PREPARE : OS, CN

- Intern: Just basics will do, though a little extra knowledge never harms.
- Academic courses.
- GFG and other online courses/resources.

# HOW TO PREPARE : OOPS, DBMS AND MORE

- OOPS/DBMS: online courses and other resources.
- SYS Design: Interviewbit, Gaurav Sen YouTube etc.
- No academic courses are offered for these.
- Others – Compilers, Distributed systems.



# POINTS TO REMEMBER

- CG Matters!! (7+ safe, 8+ good, 9+ Google, Tower etc.)
- C++/Python == saviours, respect these.
- Experience matters! (even if its an unpaid intern :P)
- Familiarity with web/android/ios dev gives an edge.
- Web – MERN/MEAN etc.
- Cloud computing - AWS, Firebase, Azure

# QUANT TRADING

Ayush Singhanian

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# QUANT || SDE

Ayush Singhania

# QUANT || SDE


## QUANT PROFILES :

- Better payouts
- Faster feedback
- Faster growth
- Faster skill development
- Focused more on financial modeling and markets

## SOFTWARE PROFILES:

- Relaxed work environment
- Brand Equity
- Perks
- Focused more on algorithmic dev and maintenance



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# IF QUANT: HOW()

Ayush Singhanian

# IF QUANT: HOW()

## BASICS OF SDE PREP :

- DSA
- OS
- CN
- DBMS
- Distributed Systems
- Sys Design

# IF QUANT: HOW()

## BASICS OF SDE PREP :

- DSA
- OS
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- DBMS
- Distributed Systems
- Sys Design



- Mathematics (Stats, Lin Alg etc.)
  - Data Science
  - ML
  - Financial Modeling
  - Interest in the markets
  - And much more
- Ayush Singhania

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MS/PHD



# DIFFERENT TYPES OF HIGHER DEGREES

- MS (Thesis): Contains a compulsory research component.
- MS (Project): Contains a compulsory project component.
- MS (Coursework)/MEng: Professional Masters degree, non research.
- Direct PhD: Advisable if you want to pursue it at some point in your life.

# STEP 1: EXAMS

- GRE

1. Three sections: Quantitative Reasoning, Verbal Reasoning, Analytical Writing
2. Most practice required in Verbal Reasoning
3. Good time to give it is in the summer after third year
4. Takes 3 months to prepare (if doing it leisurely)
5. Materials (what I used): Magoosh, ETS Resources
6. Waived due to COVID (check university sites)

- TOEFL/IELTS

1. Either of them are acceptable
2. Doesn't require preparation
3. Official website material is enough

# STEP 2: LETTER OF RECOMMENDATION

- For MS (Thesis)/Direct PhD:
  1. Minimum 2 academic LORs required
  2. Total 3 LORs required usually
  3. Better if professors rather than some mentor from an industry research lab
  4. Usual combination is IS/university research intern and Honours
- Non-Research Masters:
  1. Minimum 1 academic LOR required
  2. Total 2/3 LORs required usually
  3. Industry LOR works
  4. Possible combination is BTP and industry intern

# STEP 3: SHORTLIST UNIVERSITIES/PROFESSORS

- For MS (Thesis)/Direct PhD:
  1. Professors of your research interest
  2. Funding options through TAs/RAs
  3. University rankings in your subject of choice (all top 50 in US are equally good)
- Non-Research Masters:
  1. University rankings in your subject of choice (all top 50 in US are equally good)
  2. Internship/Placement records
  3. Interesting non-research projects
  4. Usually there is no funding



# STEP 4: STATEMENT OF PURPOSE

- For MS (Thesis)/Direct PhD:
  1. Unarguably the most important component
  2. Must reflect your drive to do research
  3. Must reflect why you want to research in this area (your backstory)
  4. Must link this with the work you have done
  5. Clearly specify the specific area or lab within your degree subject of choice
  6. Must mention what are you future plans, any failures in life
  7. Optionally write about prospective advisors work which interests you
- Non-Research Masters:
  1. Unarguably the most important component
  2. Must reflect your love for the degree subject
  3. Must reflect why you want to be a professional in this area (your backstory)
  4. Must link this with the work you have done
  5. Must mention what are you future plans, any failures in life
  6. Clearly specify the specific area or lab within your degree subject of choice, can mention some projects you wish to do there

# STEP 5: MISCELLANEOUS DOCUMENTS

- This university dependent
- Usually passport, resume and transcript are the only extra documents required
- Make sure the transcripts are always latest
- Sometimes a family history statement is required apart from academic SOP
- Usually, they want to know about your social background and what diversity you will bring to their community

# STEP 6: COMPLETE ONLINE APPLICATION

- This is pretty straightforward
- Personal details
- Courses done
- Your lab of choice
- Some other miscellaneous questions

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QUESTIONS?  
PUT THEM IN THE CHAT BOX PLEASE