**Electrical Engineer Interview Questions –**

1. What do you do (more specifically) as an electrical engineer?

* Currently - More in technical sales, works in a small company in a lot of areas
  + Biogas cleanup systems, methane from biogas (digester, landfill), so you can sell it as natural gas
  + Finding clients, finding quotations, translating that to the engineers, working on contracts, very active in our outreach (handles website, trade show, first contact for any customer)
  + Chemical weapons defense, make things that protect soldiers or clean up after a chemical weapons attack. They’re making something that can be approved by the FDA, he’s doing all the communications aspect of that
  1. Do you specialize in any electrical engineering topic (control systems, power systems, microelectronics, electrophysics, etc.)?
  2. What does your work entail? Is it mainly focused on CAD, (electro-)physics simulations, presentations, paperwork, or something else?
* Past jobs –
  + Started electrical engineer in a parts division at GE, working on the small motors all of the car parts work off of
    - Specifically the motor controllers (for door locks, variable speed something
  + Hating/ventilation systems (head engineer)
    - Smoke alarms, CO detectors (engineering design, development)
    - Got sold, then started working for the company you’re at now
* Specialized in microelectronics, small imbedded microprocessors
  + Control logic of the input and the control logic of the output
    - Wind-shield wipers, blower motors
* Didn’t do any of the CAD work, but directed a draftsman
* One thing that is good to do is to have a lot of application knowledge, even the LEGO stuff can help
  + No one comes up to you and asks you to solve a differential equation, they ask you to solve a problem
  + Size, power consumption, can I prove it will work for the next forty years in this plane
* One of the things we do at our company is a laundry system that they use it on the front lines, it recycles 97% of the water that it uses, it takes a lot of money/effort/manpower to bring in water so it is important to be efficient
  + Had to redesign it due to part obsolescence, the parts just aren’t available anymore (5 times in 25 years)
  + This is actually a really good point, medical devices are going to be made for a long time but maybe not washing machine parts/factory automation parts
    - By the way the taxes work, after 5-6 years its written off as having no value

1. How did you come to work at your current company?

* He did a coop with GE motors division (doco products is the name?)
* Olivia has an internship at NASA at the John Glenn space center at Cleveland
  + Go to any career days, expos, etc.
  + “it’s amazing that she got it, from a lot of her extracurricular activities she does.”
  + She joined a mars rover club, some sort of rover that would be able to make it work on mars (the competition is in Canada), it’s the first time they’ve tried being in the competition
* Highly recommends coops/internships, companies pretty much only chose the people who had participated in one
  + Getting an internship in the same environment as what you’re doing (any engineering major taking an internship in a laboratory/testing setting where you’re helping to do tests or making testing equipment), there’s still a lot that you can apply to what you could be doing in the future
  + When people are hiring for internships, they know you’ll be raw and not know much
    - When his company hired engineers they emersed them in what they’re doing.
    - The processes his company works in is absorption (pressure swing absorption), there’s no way someone is going to know enough after a two week course going over that enough to design a pressure vessel
      * The ‘tribal knowledge’ that everyone in a company has that no one writes down is something that an intern is going to have to learn
      * Soak up everything that comes your way when you’re an engineer, act like a sponge
      * A lot of projects are interdisciplinary, there are likely no textbooks in the world that will apply to every single possible application
        + Figure out and learn why a company is doing what they’re doing, understand their decisions
* Didn’t really have any course in particular that was especially helpful
  + He graduated in 1985, when electrical engineering was changing so fast that his textbooks and what he learned in college was obsolete
  + The first computer revolution was happening, the size of microcontrollers was getting smaller and smaller, the colleges hadn’t caught up to it
* He found that becoming a PE (he has his PE) was beneficial
  + Studying for the second test five years out of school, there were a lot of concepts that he didn’t understand coming out of college that he understood after being in the field for five years
  + He’s only had to pull out his PE when testifying in court about smoke alarms, he never worked for companies where having a PE needed the ‘public signing’ abilities
* He learned fortran, basic, PL1, assembly language
  + He did a little bit of programming in assembly language, but now microprocessors are mainly using C and C++
  + He occasionally uses BASIC when he has to do file manipulation
  + PL1 is a combination of fortran and cobal (the bank/financing language, sometimes for databases but then got overwhelmed with Oracle)
  + A lot of the first internet stuff was done with visual basic, things like LabView was written in visual basic. You can write visual basic (15-20 years ago) to do subroutines – useful from a lab standpoint but not a product standpoint
    - Designing equipment to test stuff is a more optimal situation to use it
* Having a good working knowledge of LabView
* Olivia is taking Python right now, apparently struggling with it
* Any engineer should take a business class (accounting or finance) will be helpful, you’ll have to interface with people that deal with money and you’ll need to speak their language
  + The business majors handle the money that lets you do things, you have to prove that you know what you’re talking about
* He came to work at the company that he works for now by connections. The prior smoke company was bought by the first place competitor, and they only wanted the customer list and nothing else
  + He put a widespread call out there to find things, and Margaret (great aunt Margaret) went to school with the person who owns the company he works at now. The company was in Dublin, Ohio and he wanted to stay in the area and not move if possible due to his gradeschool kids
    - They needed someone to be a business manager, but they wanted something with a technical background because business majors had not worked out well for them in the past
  + Always keep your resume handy to jump on an opportunity
* Financial Stuff –
  + He likely wouldn’t tell people to go into electrical engineering, specifically the small microprocessors stuff was only just getting outsourced to Mexico, China, Vietnam, and other places. Overtime the design and engineering of those parts went overseas
    - He kind of went obsolete, at least as an American microprocessor designer
    - It’s tough to look 20-30 years down the line to see if the situation will change a lot
      * In the aerospace field there will always be an aerospace industry in US. Boeing is the only big aircraft designer left, the smaller aircraft is with smaller companies – the new stuff is in space.
      * What industry is going to be the first adopters of robotics in space? Who are the customers going to be?
        + Probably militaries (replacing humans)
        + Also just generally, space applications
        + He bought a robot vacuum 15 years ago as a specialty manufacturer and now they are made by a ton of companies in China
  + When you’re in a company, the advice he gives to his kids is to not pick a career – pick an industry and become useful to that industry.
    - Say “I want to be in space” or “I want to be in radar systems/defense electronics” and then get the skills useful for that industry
      * Not all of it is technical skills, some of it may be understanding the market, understanding the trends and what’s changing
      * His wife was in general education at Toledo and then in education, then her parents tell her to come home and asked her “what does she like to do” and she said “I like to be on vacation.” Then her mom said “then let’s look up vacation management,” and his wife thought that would be cool.
        + She looked up the best colleges for vacation management and applied, got into the two best colleges and has been working in the industry since
      * Mike Rowe, a big advocate of people getting trade degrees (he was in the show Dirty Jobs) – tells people to not work in your passion, find opportunities and bring your passion with you
        + You’ve always got to find ways to make yourself useful for your industry, keep developing your skills
  + Benefits/Insurance
    - He pulled out after an interview when it was just down to him and one other person, but his kids were more important
      * His wife doesn’t have benefits but depending on the year she might earn more
    - Comfortableness with salary -
      * At the first job he had (at the small motors people) he was around the bottom 10% of the total range, but of the people just out of college there wasn’t much change
        + The industry didn’t have much salary growth, though, and after eight years he didn’t have much salary growth at all
        + When he took his next job he gained 25% in salary
        + Since his parallel move (to keep his kids in one spot) he didn’t make much more, but last year the company did really well and he got a bonus worth 25% of his salary

High risk, high reward can be worth it sometimes due to growing with the company

* + - * + Within current electrical engineers, he doesn’t really know, but going off of what he said he’s at least in the top 10% (he was the principle engineer at his last electrical engineering job)

Top 10% is a mid-career rather than late-career? How does that work?

Once you get above 55, there’s not that many companies that want to take you on

The early, mid, to late career salary/pay scale works

You need to decide within the first ten years whether you want to be an engineer or be a manager, so some people in the surveys of salary might be working as managers

You usually don’t find many high-paid engineers, usually 10-15 years down the line the finance people are being paid more

This is pretty much what I thought, “am I better off for my sanity/benefit – am I going to enjoy being a manager or an engineer more?”

He moved to being a manager at 35, then at 45 he switched back to engineering, then a few years later he became a more business/marketing person

There’s virtually no advantage to getting your PhD unless you want to be an academic

He got a Masters but its really not been needed outside of getting him his second job. It was on a project that he was working on at General Motors

He generally doesn’t like Academics as they don’t have enough industry experience, one of his professors was from Poland and in Poland every seven years they had to take a sabbatical and work an actual engineering job (at another university) in order to gain industry experience.

It doesn’t work that way in the US,

Unless you are working for something very hard or very special, he recommends to not get a Masters degree

The best way to make money as an engineer is to just start your own company. His wife’s brother went to Kent State university, and so many of his friends started their own company and are making a lot of money now. It's risky, but it can make you a lot of money. That’s why speaking the financial language is important, you want to go out of college without having the “I will be an engineer and an engineer only” blinders on

If you’re planning on doing a convention, his wife communicates and negotiates all of the stuff needed for that. Eighteen of her clients run ballroom dance competitions, and her main client’s thing has grown so big that he writes a check and rented all of the rooms within a hotel for five consecutive nights. He then sells them as packages for people to sell, compete, whatever – essentially, there are a lot of ways to make money and a lot of them don’t involve engineering

* + Housing Market Stuff –
    - It depends on where you are (there have been bear sights in Detroit, its going back to nature lol)
    - He remembers looking at that stuff 15 years ago, and there was a friend of his was saving only $100 a month (which was only enough for a $40k house)
      * His advice is to buy a small condo with 1-2 friends (with you as the owner), and they can help pay your mortgage
        + You definitely don’t want to wait 10 years to buy a house
      * If you start your own business you want you life to be as simple as possible, so right out of college is technically the best time to do that (before you have a wife and kids, so living off of ravioli isn’t that bad of a decision). Do it at 23 rather than 43, don’t bring your wife and kids down with you.
    - Live in a place for a while before you buy a house, you need to know what is doing well and what neighborhoods is doing well
      * Move into the best school district you can, if anything it will influence how well you will be able to sell the house
      * The first house he bought was in (the city of) Dayton, and it was where the firefighters, police, teachers, etc. (the people that worked in the cities), which was two blocks from the best suburb. Once people found out that the house was not in that best neighborhood they turned around and walked out
  1. What internships, coops, or research opportunities did you take part in?
  2. What college courses (undergrad or graduate) did you find to be the most important or helpful when starting your career?
  3. What software or programming knowledge should an electrical engineer be familiar with?
  4. Are there any specific tools or programs that newer electrical engineers lack (that could potentially give me an edge in future applications)?
  5. Are there any courses that you took during college that were not required for your bachelor’s degree that you found helpful when starting your career?
  6. What led you to work for your current company specifically?

1. If you are comfortable with discussing it, how comfortable are you with your financial and/or benefits situation as an electrical engineer?
   1. Throughout my time in college, it has been suggested that engineers usually get better benefits packages in comparison to non-STEM fields. If it is not too private of information, in your career how much of a percentage of your salary were those benefits worth?
      1. Or to put it another way, have you ever taken a job that paid less in salary but due to its benefits package you chose to work there? How did you determine if it was worth it (if this is not just an easy answer by looking up different insurance plans)?
   2. How comfortable are you with your salary in the current economy?
      1. What did your salary progression look like in your career? How long did it take to go from your starting salary to your current salary (and if you are comfortable with disclosing it, what percentile among electrical engineers are you in salary)?
      2. Were there any points in your career and/or family life where your salary became a major worry?
      3. With the current US housing market, how possible do you think it would be for a starting to mid-career electrical engineer to purchase a one family home (this is one of the more worrying questions for me currently)?