Suggestions on How to be Competitive in Industry as a BME

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**TL;DR**

If you want to be considered for a job you need to meet the qualifications (or at least those of the better half of your competition). You will have to do more than just get a degree to meet those qualifications. Know who your competition is and make sure you match that archetype.

Take job searching/preparation seriously. Even if you’re pre-med/pre-grad you should assume (at least until your first internship) that you’re industry bound and prepare for that. It is generally easier to convert from industry bound to grad/med school bound than the other way around.

**Job Search**

**Resume**

* + 1. Only put stuff on there that you’re confident about.
    2. No Grammar Errors, no “references/contacts”
    3. Limit 1 page. Must be easy to scan vertically.
    4. Highlight any past work experience and major project experience. Relevant coursework especially any tech electives. Limit these to top 4-8 courses specific to the industry you’re looking for.
    5. List your GPA to 2 decimal places and don’t round up.
    6. Once you’re in sophomore year try to limit the number of high school stuff on there (really only keep work experience or major engineering projects). By Junior year there should be nothing from high school.
    7. LinkedIn – an electronic more detailed resume. Make this ASAP and keep it updated as you do more projects, get more experience. Connect w/ your peers, grad students, professors, etc.

**Interview**

1. Highlight soft-skills.
2. Be able to explain why you’re a BME major & what BME is.
   1. It’s better to overdress than underdress.
   2. Limit open-ended answers to ~2 minutes long.
   3. Have prepared questions for the interviewer to ask at the end.

**EXPO**

* 1. Research the company before you interview/apply. Know their industry, their HQ location, their top products/services, major news about them over the last year (acquisitions, etc), look up and follow their LinkedIn page (I’ve gotten several interviews by talking about a company’s post on linkedin from like a month or two before).
  2. Practice your elevator pitch w/ a friend and give each other feedback.
  3. GO TO EXPO EVERY YEAR. It doesn’t matter if you aren’t planning on doing industry. It’s great practice networking, interviewing, and it forces you to review what you’ve done with your time so far at UT and keep your resume up to date.
  4. Apply online to all the companies/positions online that you plan to visit before EXPO. Then you’ll have time for applying to the companies you didn’t expect to visit but did anyways as well as dinners/info sessions the nights after EXPO.
  5. Take notes about your conversation after each recruiter at expo and after interviews. This can help you improve in the future and can be good reference for follow up interviews or reaching out to the company in the future.
  6. Get business cards as often as people will give them (without being annoying/weird about it).
  7. Remember: Recruiters were you once. Don’t be intimidated by them. All they want is for you to show an interest in their company, show that you’re qualified for their program, and that you’re easy to get along with.
  8. Go to expo prep sessions and Margo Cousins’ semesterly “How to Get a BME Job or Internship” session.
  9. The [ECAC](http://www.engr.utexas.edu/ecac/students) office has amazing EXPO prep resources like mock interviews, resume reviews, info sessions, industry panels, etc. All of these are 1. A great way to prepare and 2. Can help you meet recruiters before EXPO which will immediately elevate you to a better position with them when you talk to them at the fair.
  10. It is very hard to get interviews from EXPO as a freshman (and as a sophomore pending on the company), but it is by no means impossible. You just have to find the right companies/positions.
  11. Don’t be afraid to take a non-technical position after your freshman year, this can give you a leg up when looking after sophomore year. (Could also take tech electives or do research over the summer)

**Other Resources for Jobs**

1. Career Fairs (EXPO/BABS/UT Science & Technology Career Fair)
   1. These have by far the highest ROI (return on investment). You spend a night or two researching ~12-15 companies and applying online and if you’ve done the other things this document recommends then you should get a few interviews out of it from companies who are highly interested in hiring UT engineers. ii. It is perfectly fine to go to non-engineering expos also. Things like BABS & CNS Expo can also be valuable if the Engineering expo didn’t lead to an offer.
2. Family/Friend References
   1. If you are interested in working at a company that a friend/peer worked (or is currently working) at and they’re willing to recommend you to their manager then that can really go a long way. This type of referral accounts for a majority of hires in industry. I’m skeptical about the actual number but I’ve had recruiters claim that this is around 75-90% of how their companies hire.
   2. This requires having friends in your technical field. You have to do stuff with student orgs to get this.
3. Networks (i.e. LinkedIn)
   1. These can be helpful in getting contacts in companies where you don’t know anyone yet. UT Alumni love hiring/helping other UT students/alumni because they know the quality of our education. Get on the UT Engineering & UT BME LinkedIn pages and message people on those people who work for companies you’re trying to work for.
4. Cold Email
   1. This is usually a last resort, but is more commonly successful for smaller companies who don’t have the $ to go to EXPO. It generally has the lowest ROI and if you’re going to personalize every email (which you should) it takes up a lot of time.

**Internship v Co-Op v Part-Time**

1. General
   1. Internships and Co-Ops are literally the best possible thing you can have on your resume. They validate you in that:

Some hiring office thought that you were smart and personable enough to pay to work with you.

You get amazing project and business culture experience which you can talk about in an interview for anything else (even grad/med school interviews).

You are able to apply the stuff you learn in school to real problems and it honestly makes you appreciate everything you’re learning so much more.

Once you have your first internship/Co-Op you’re instantly on the short list for future interviews and the whole job search thing gets sooooo much easier.

* 1. You make $ and can pay for your education and ridiculously overpriced official transcripts.
  2. Don’t be picky for your first one. And remember “one in the hand is worth two in the bush” meaning if you’ve got an offer that expires before another preferred company contacts you back take the dang offer.

1. Internships
   1. You can usually graduate in 4 years as a BME while doing internships over the summer.
   2. Many will offer housing/travel stipends.
   3. There are more of these programs but also more students who want them.
2. Co-Op
   1. You get deeper and better project experience.
   2. You get an extended break from school.
   3. Guarantees graduating a year late (for certain catalogs, @ Margo for more information), however the ROI is enormous, and risking your career to graduate “on time” is highly overrated.
   4. Some companies will pay for your tuition/housing while you’re at the co-op (this is not super common). If they don’t then your earnings will still pay off the extra year of school.
3. Part-Time working (at a company)
   1. This is pretty hard to do early in your college career especially if it’s off campus or you don’t have a car. I generally recommend against this until you’re in your senior year and have finished most of your other coursework. If you need income there are plenty of well-paying student jobs on campus that are super flexible with your finals/exam schedule.

**Professional Development**

**Brand/Portfolio**

1. General
   1. Your brand matters. How you are able to present/market yourself is very important when looking for a job. Employers will look you up on Twitter, Facebook, LinkedIn before considering hiring you. Keep that stuff PG.
2. Portfolio
   1. You can do a lot of stuff to maintain a “portfolio” of your work (extremely overrated). Some people recommend making a website or keeping your LinkedIn profile on point (good idea, but has a lot of limitations). I believe that [GitHub](https://github.com/) is by far the best tool for maintaining/building your portfolio. It is primarily used by Track 3 BMEs, but can & should be used for any track/major. It takes a bit of time to learn how to use it, but anything/everything you need to know is on the internet for free.
   2. Why GitHub?
      1. Free & Unlimited Storage (Private & Public)
         1. <https://education.github.com/pack>
      2. Version Control – You never lose a copy of anything you’ve ever put on GitHub & it can store files in any format.
      3. Customizable “Readme” files that let you talk about/introduce any project that you upload incl. but not limited to embedding videos/images/text. These are what you want to make sure are very “clean” since they’re the recruiter’s first impression of a project & will determine if they look further.

**Student Orgs**

* + 1. Join and be very active in at least 1 BME student org and 1 other technical org. BME orgs will help introduce you to upperclassmen who have gone through what you are and they’re really amazing resources (i.e. BMES,BOLT, BMP).
    2. Technical orgs will give you meaningful project experience starting as soon as you join. See <http://engr.utexas.edu/studentlife/orgs> and <https://www.cs.utexas.edu/undergraduate-program/student-organizations> for some good ones.
    3. You get out of student orgs what you put in. If you’re really involved you’ll do things that you can put on a resume and talk about in an interview, you can get elected to an officer or committee chair position early and that shows that you’re likeable and can manage people.

**Competitions**

* 1. Things like BMES Design/Case Comp and Roden Case com are great things to talk about in interviews (especially if you place).
  2. If you’re track 1/3 it is also very helpful to go to hackathons (<https://mlh.io/> )

**Research**

1. Research can be great experience, however it does not substitute for your fundamental tech-electives. It can give you really good project experience and introduce you to pretty cutting-edge technologies.
2. Being able to master a very technical subject is good to prove that you’re smart and can think critically/creatively.

**GPA**

1. GPA is important, but not nearly as important as it is if you’re pre-med. Keep your grades up, but employers mainly use it as a gauge. If there are several other signs that you’re very capable and like engineering (such as participation in technical student orgs/competitions/research).
2. The three GPA cutoffs for industry are as follows: 3.5 (competitive), 3.2 (normal), 3.0 (minimum). Keep above a 3.5 if at all possible since then GPA is not a question at all. 3.2-3.49 will put you out of the running for some of the more competitive positions, but it shouldn’t be too hard to find a job. If you have between a 3.0-3.19 you’ll find it harder to get positions, but still doable. Below a 3.0 makes it very difficult to be considered for many positions.

**Track-Specific**

**Classes to Take**

General Recommendation: take any/all AP or DC credit that you get coming out of high school regardless of how “confident/comfortable” you feel in the subject. Anything you forgot or missed in high school you’ll remember/pick up pretty quickly. BMEs have so many classes to take already that if you want to be able to follow the below suggestions you’ll need as much open space in your degree as possible.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Fundamental tech electives to be considered in industry | | | |  |  |  |  |  |
|  |  |  |  |  |  |  |  | Expected by End of Sophomore Year |
| **Track 1** | EE319K | EE 312 | EE 316 | EE 438 | EE 445L |  |  | Expected by End of Junior Year |
| **Track 3** | EE 319K | EE 312 | M 325K | EE 360 | EE 422C | EE 461S |  | Expected by End of Senior Year |
| **Track 4** | ME 316T | ME 314D | ME 344 | ME 114L |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| More Tech electives to be competitive in industry | | | |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| **Track 1** | EE 438K | EE 445S | EE 460N | BME 374K | BME 374L |  |  |  |
| **Track 3** | EE 445L | EE 445M | EE 460N | CS 327E | CS 329E |  |  |  |
| **Track 4** | EE 319K | ME 350R | ME 372J | [mechatronics](http://www.me.utexas.edu/undergraduate/bridges-to-future-certificate/mechatronics) | [robotics](http://www.me.utexas.edu/undergraduate/bridges-to-the-future-certificate/robotics) | [design](http://www.me.utexas.edu/undergraduate/bridges-to-the-future-certificate/design) |  |  |

**Things to Know/Learn Outside of Class** (Should have advanced skillset with multiple things in your track’s subsection, but don’t need to be advanced in all)

**Track 1**

* Embedded Software/Microcontrollers
  + Arduino
  + Raspberry Pi
* Analog Circuit Design
* PCB Design
* Soldering
* How to use Oscilloscope, Mixed Signal Generator

**Track 3**

* Embedded Software/Microcontrollers
  + Arduino
  + Raspberry Pi
* Data Structures
* Algorithms
* Design Patterns
* Databases (i.e. MongoDB, MySQL)
* Multiple Programming Languages
* Mobile App Development (Android, iOS)
* Web Development (HTML, CSS, JavaScript, etc.)
* Network Programming
* Machine Learning/Neural Networks (TensorFlow)

**Track 4**

* CAD (default is Solidworks)
* 3D printing
* Machining
* Microcontrollers (i.e. Arduino)
* Servos/Motors

**Helpful Resources**

**Track 1**

**Track 3**

[SourceMaking.](https://www.sourcemaking.com/) Great website to learn how to do a lot of things that you’ll be expected to know when you’re a Junior/Senior and looking for more experienced positions.

[Lynda.](https://www.lynda.com/) Choose “organizational login” and “utexas.edu” and you can login with your EID/password. This is a great first place to start when you want to get introduced to a new subject.

[Cracking the Coding Interview](https://www.amazon.com/Cracking-Coding-Interview-Programming-Questions/dp/0984782850/ref=sr_1_1?ie=UTF8&qid=1481871340&sr=8-1&keywords=cracking+the+coding+interview) – This book is a must buy. It bridges the gap in your class knowledge and what hiring managers expect you to know. If you can talk about all of the things in this book (design patterns, common algorithms, data structures, major programming techniques/concepts) you’ll be very prepared for any general programming interview.

**Track 4**

**Notes for Margo**

So I don’t know too much outside of track 3. You’re welcome to use/modify/pull from this document in any way you see fit. I got some EE & MechE friends of mine to review the Track 1&4 course suggestions.

If you have more questions, want more information, or want clarification please don’t hesitate to ask.

This is a first version so I’ll probably add to it, get others to add to this in the future. It needs more Track 1,4, and (especially) 2 input.

**Karl’s recommendations for BME as a major/department**

I don’t really know how this works, but there’s a bunch of really cool MechE, EE, ChemE, CS classes that I think would be great to let BMEs take particularly their senior year that I don’t think BMEs are allowed to register for b/c they’re blocked for those departments. If there’s anything we could do to extend the flexibility of what non-major classes BMEs could register for that would be really useful.

Anecdotally I think there’s a lot of really cool classes that BMEs can/should take, but our degree has so many (inflexible) courses that students don’t have the time to specialize enough. There’s obviously exceptions to this, but I think it applies to the average BME industry student. Specifically the degree front-loads all of the necessary and inflexible courses into sophomore & junior year. This discourages students from taking the necessary tech electives (those aren’t easy classes) in order to compete in industry. They see a wide open senior year as the time to take those, but really they need to be doing the core competency stuff early such that they can get the more advanced upper division coursework done their senior year when they really know what they want to do and what they need to know to do that. Too often this means we have graduating senior BMEs who don’t have much/any relevant industry experience because they were behind the curve applying for internships who are now behind the curve or not qualified for technical full-time positions.

I know that there’s a lot of stakeholders that all want BME to be different (sometimes conflicting) things, but moving forward I would like it if we focused more on the Engineering side and less on the Bio side.

I also think that we have too many core competency classes that are all theory and no lab/practical component. As a result the subjects don’t stick with us nearly as well as they should or as well as they do for the other majors. This hurts us for both industry & grad school. Examples include, but are not limited to:

Circuits lab that aligns w/ or is part of BME 311

Materials lab that aligns w/ or is part of BME 352 (see ME 134L)

Heat transfer lab that aligns w/ or is part of BME 353 (see ME 139L)