

EM GUIDE

What is Engineering Mechanics? | Grad Tips | Logistical Information

What can you do with an EM degree?

EM provides the background to understand most engineering problems, and the specialization comes from electives and research. Most of our students pursue jobs similar to mechanical engineering, material science engineering, or aerospace engineering students after leaving Virginia Tech.

How long does an average EM degree take?

Master's students normally graduate in 2 years. Accelerate UG/G students typically graduate in 1 to 1 1/2 years. Ph. D. students take between 4 and 6 years.

Quick Links

Department Webpage:
www.beam.vt.edu

GEMS Webpage: gems-esm.wixsite.com/home

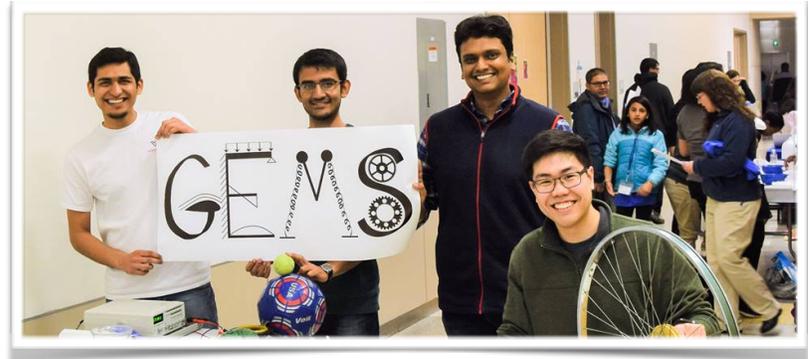


Photo of GEMS students helping out with [Kids' Tech University](#)

What is Engineering Mechanics?

Engineering Mechanics is the study of how materials (solids or fluids) deform and move. It's a broad field that covers droplets to swarms, from sheet metals to duck feathers.

What kind of research happens in EM?

We consider our research to fall under four main categories: Fluid Mechanics, Biomechanics, or Dynamics & Control. Most research falls in more than one category, but some examples of research in these areas are:

- ✦ Fluid Mechanics: Droplet jumping, water harvesting and cleaning, how birds withstand high impacts with diving
- ✦ Solid Mechanics: Fracture mechanics, adhesive properties, material science collaboration
- ✦ Biomechanics: Flying snakes, swarms of bats and fish, mosquitoes drinking mechanisms
- ✦ Dynamics and Control: Travel of airborne microbes, planetary dynamics, thin film deformations, energy harvesting from vibrations



Photo from [freezing soap bubble](#) from Dr. Boreyko's NIFI lab

What is the time commitment of an EM graduate student?

Those with a GRA or GTA position are expected to work ~26 hours during the semester on the work they are paid to do. (The contract states 20 hours a week, but for a longer period of time than the academic semester). Personally, I would block 2.5 times the number of credit hours for academic classes (e.g. 9 credit hours ~ 22 hours of time dedicated to those classes) as a rough estimate. While GRAs and GTAs are required to sign up for 12 credit hours per semester, any number of Research and Thesis hours may be taken to reach that goal. Each advisor has their own policy for receiving credit for Research and Thesis hours.

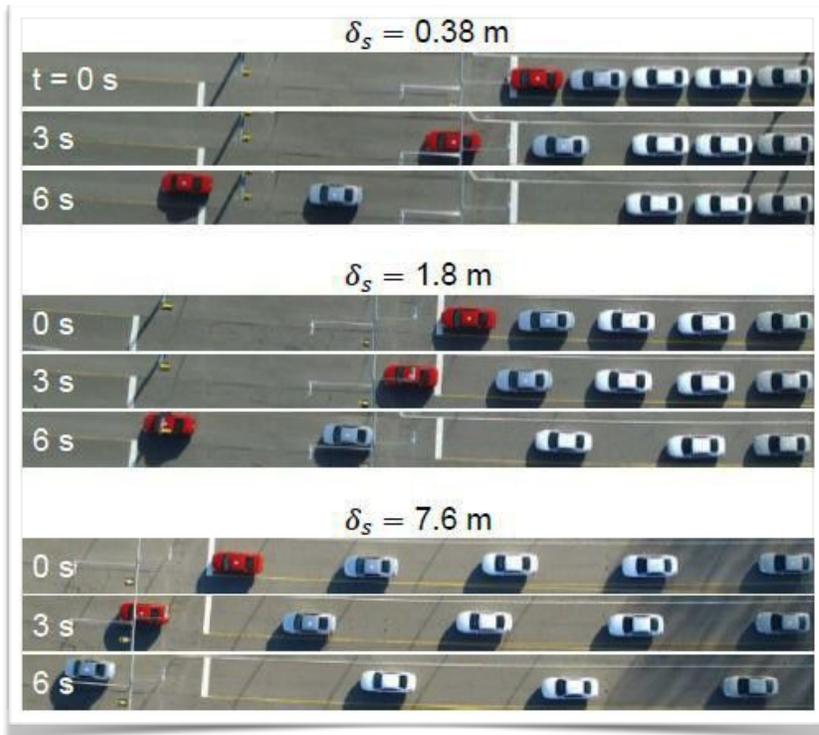


Photo from [tailgating traffic study](#) by Dr. Boreyko's NIFI lab

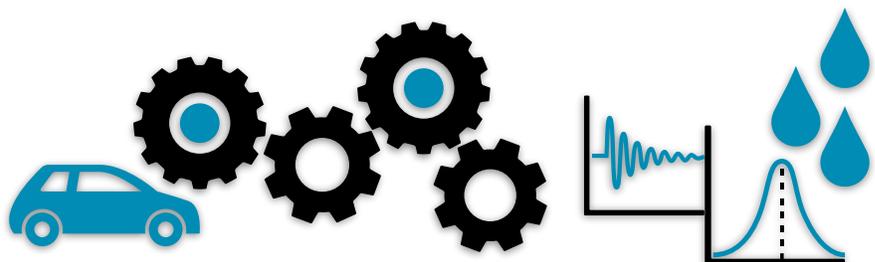
What job opportunities are there after graduation?

Besides academia, an EM degree will give the flexibility to work in automobile industry, aerospace industry, mechanical industries, etc.

Skills, communications, courses, research work, contacts are more important than the degree name.

Check out our [LinkedIn](#) group to connect with alumni to see what they are working in, or the Career Services website to see where previous graduate students were hired.

International Students - There are positions available, depending on company policies, but it may be a longer process than a domestic student will have. Virginia Tech offers workshops on how to work with companies to encourage them to hire international students.



Logistics - You're in, now what?

Useful Links for Travel and Housing

- ✦ [VT Housing, Sublets & Roommates](#) (subleasing options, etc.)
- ✦ [Carpool](#) (rides to and from Blacksburg)
- ✦ [Free & For Sale](#) (cheap used items, including furniture)
- ✦ [GEMS!](#) (GobblerConnect page with links to our social media accounts)

Dining Options

There are several [on-campus dining options](#). Also, downtown is located at a walking distance from campus and you can have more dining options in downtown.

You can eat at any of the dining halls without a dining plan by paying with credit card or cash. Purchasing an off-campus dining plan is not recommend as you normally don't save any money.

Cooking at home is the cheapest and healthiest option, especially if you plan meals ahead of time.

Contact Us

E-mail: gems.esm@gmail.com
 Website: gems-esm.wixsite.com/home

Best way to get to Virginia Tech?

Nearest airport is Roanoke (about 45 mins by road). If you fly to Roanoke, you can come to Virginia Tech by [Smart Way bus](#) (\$4) or take a cab with Roanoke Airport Transportation Services (-\$60). You can contact us, and someone can try and pick you up or help you arrange for some mode of transport from Roanoke airport to campus.

For international students visiting US for the 1st time, we would recommend flying to Roanoke rather than to Washington DC or Charlotte. You will have to go through customs (and collect any checked baggage) at the first airport you arrive at in the US. This can take a long time, so make sure you have a significant delay before your flight to Roanoke.

Avoid taking flight to Charlotte since there is no easy public mode of transport available from Charlotte to Blacksburg. [AMTRAK](#) works, but it involves a train transfer and a bus.

From Washington DC to Blacksburg, there are multiple options- Virginia Tech [campus-to-campus shuttle](#) (-\$95), [Virginia Breeze](#) (it has a stop at the Dallas airport and come till Blacksburg campus, -\$50), [AMTRAK](#) from Union Station to Roanoke and from Roanoke AMTRAK has bus to campus or you can opt for options mentioned above for travel from Roanoke. (Please note: for buses, there is limit on bags you can carry, please check information regarding the same on their website)

Carpool - there might be people driving to Blacksburg and have seats available so you can join them. Students usually post about carpool on facebook (VT Carpool, Virginia Tech Carpool, Virginia Tech NOVA carpool are some groups you can join)



Debating between a M.S. and Ph. D.?

Converting from a M. S. to Ph. D. is an easy process if you have an advisor. It's simply paperwork for the graduate school.

You can get a M.S. (thesis or non-thesis) on the way to a Ph. D.

If you think you want a Ph. D., applying as a Ph. D. student will help you find funding.

Social Life Tips

GEMS likes to host social events like Game Night and Pizza parties so our graduate students can interact with each other outside the lab.

There are different organizations for all types of communities that host events that you can explore with GobblerConnect. For example, here is [GEMS](#).

GobblerFest is a great event to explore the different clubs at the beginning of the school year.

We feel Blacksburg and Virginia Tech have an accepting environment and students representing a wide variety of countries.



Photo from a GEMS social

What is the best housing option for Graduate Students?

For graduate students, on-campus housing is only in [Graduate Life Center](#).

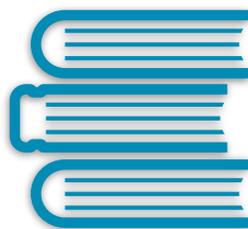
Mostly students prefer off campus housing which is cheap and more flexible. There are many leasing offices (CMG Leasing, BCR Property Management, Raines Property Management, Terrace View Apartments, Shawnee, Chasewood downs, Foxridge Apartments, The Village, The Edge Apartments, and more). You can find housing options at [here](#) or visit the leasing offices websites to find details. Off-campus housing rent may vary from \$250 - \$600/mo.



Find other graduate students coming to Virginia Tech and sign lease together. Lease agreements can be signed electronically and there will be a deposit amount (usually rent of a month).

Contact current students in Virginia Tech who might have a room available for the next academic year. (Facebook group on housing availabilities and sublease - Virginia Tech (VT) Housing, Sublets & Roommates). Craigslist is also another option but we don't recommend it when you are arriving in US for the 1st time (There are some scams on it as well).

University buses are free for students (paid for in the fees) and run at a good frequency in the town. We suggest you to check the proximity of the apartment to the nearest bus stop when deciding on an apartment. Bus routes can be checked [here](#).



How about the classes?

Graduate classes are the same for M.S. or Ph.D. students (but the requirements are different). Any graduate student can attend any courses from 4000 level in any department. Degree requirements for M.S. or Ph.D. can be found in detail on the [BEAM website](#). Look for options below Engineering Mechanics for EM related details.

Plan on taking the math credit during the Fall semester, most of the 5000 level math course have a 2 semester part and would be difficult to pick up in Spring.

Don't have a full GRA or GTA position?

Graduate assistantship positions in music department, graduate life center, and others may also be available.

Partial graduate funding (R.A. or T.A.) - 1/4th or so which makes you an in-state student and so out-of-state tuition gets waived. For more details on graduate assistantships, click [here](#).

Other on-campus jobs are [dining services](#), graduate school, library, grader positions in different departments (Maths, Physics, etc.). For the grader position, you can probably speak to the staff coordinators in the respective departments for the available positions. All the above mentioned positions are hourly basis wage positions (8\$-12\$/hour).

There are a off-campus jobs in Blacksburg as well. Note that International students can't work off-campus without university authorization.

Internships can be done during the summer breaks or a semester long co-op opportunity. It is recommended to discuss about with your advisor if she/he would recommend an internship or would prefer you to stay back and work on your research. Your advisor will also be useful in finding industry contacts for these positions.

What about funding and picking an advisor?

Faculty members are more likely to fund Ph.D. student but there are projects for which professors may prefer M.S. students.

Contact the professors you are interested to work with via email and you can plan to decide on an advisor before you arrive at Virginia Tech in August.

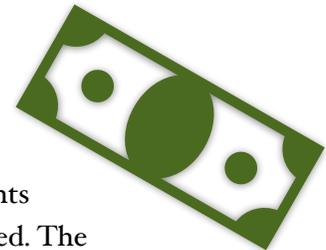
You can also look for professors in other departments who you might be interested to work with. Feel free to contact them as well. We have a flexibility to work with professors in other departments (provided they are affiliate faculty in BEAM or are willing to become an affiliate) and still get a degree in EM.

Check the graduate regulations manual for EM program about the timeline to find an advisor. It is recommended to do it as soon as possible so that you can work start your research thesis soon. (Also, some professors will assume you aren't motivated if you wait until the deadline to find an advisor.)

There are rotational programs available to help you get lab experience while looking for an advisor.

Are university stipends taxable?

Graduate Teaching Assistantship (GTA), Graduate Research Assistantship (GRA), Graduate Assistants (GA) are taxable. Fellowships aren't taxed. The taxes get deducted at the source. We file tax returns at the end of the financial year.



The amount on the offer is before taxes. Federal taxes details and state tax details can be found [online](#) if needed. If the gross amount is about \$2000/mo., in-hand amount would be about \$1400/mo. after taxes and comprehensive fee deduction (fee deduction can be done paycheck by paycheck or as a lump fee).

The amount you get after taxes is sufficient for a person to pay the rent (- \$300- \$500), food (if you cook everyday, -\$100-\$150) and all basic necessities. It depends from person to person on the way of living but it should suffice for all basic needs. Meals at the dining halls or restaurants usually are around \$7-\$10.

International Students - There are tax treaties between some

Tips for bringing in money to US (International Students)

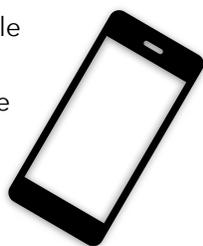
Some cash money in dollars for initial few days and some money on travel cards (multi-currency cards or international credit card)

For initial few days, it is good to have approximately \$1500 divided in cash and travel card. Do not carry large sum of money in cash (look at the maximum amount allowed). More details can be found [here](#).

Need a cell phone (International Students)?

Check if your mobile devices are compatible with the bandwidth in USA. (there are some websites)

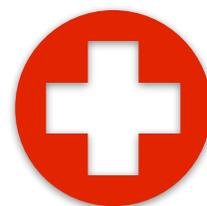
For carrier options, look at Verizon, AT&T, H2O, Lyka, T-mobile, Sprint, etc. You can get sims at the airport for the initial few days. Postpaid plans are preferred than prepaid plans. There are family plans so you can get cellular plans in a group which can be cheaper.



countries and USA. Check to see if you will be taxed by either your home country or the USA, or both.

What about health insurance?

For students who have a funding, it is preferred to go ahead with university insurance i.e. AETNA. It is subsidized, so 88% of the insurance cost is covered by the university. You pay around \$20 per paycheck.



If you are not funded, ISOA is another cheaper option than AETNA.

Domestic Students - If you can remain on your parents' health insurance, that often has better coverage than the university insurance AETNA.

International Students - General advice: get all medical check-up done before coming to USA. Get your teeth cleaned, checked, filing if needed, etc. Get all of it done so that it isn't a problem when you arrive.

For any medical condition for which you need medicines regularly, check the insurance details to make sure it is covered.

Dental is not covered in most insurance. You can add it in the insurance if you wish. It is costly so would recommend checking on the insurance websites for the details.

Plan to carry some basic medicines (there might be some medicines which are banned in US, so check the ones you bring). It is recommended to have a prescription for all medicines you carry, handy, to avoid any problem at the immigration (it's better to be prepared). You are not allowed to carry more than 6 months of prescription medicines.

Glasses can't be made in the US without a prescription. Get 2 pairs of glasses or a prescription which can be used to buy glasses here.