

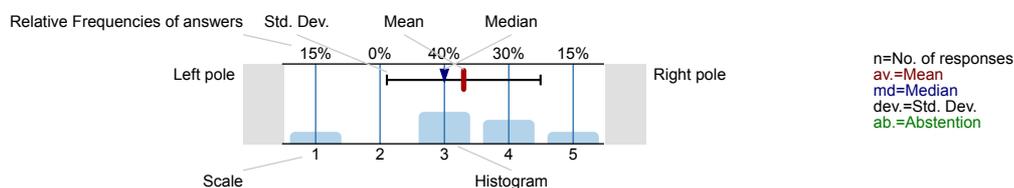
M-AP, Alumni survey Applied Physics
2020/2021
No. of responses = 71; Response rate = 0%

UNIVERSITEIT TWENTE.

Survey Results

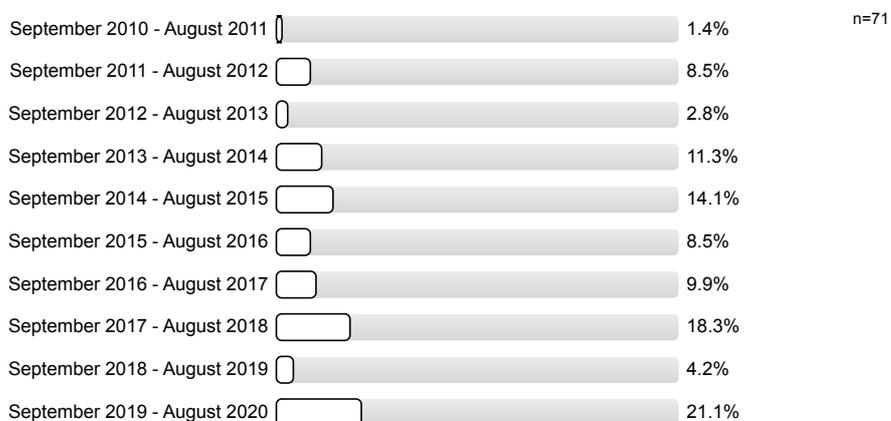
Legend

Question text



1. About you

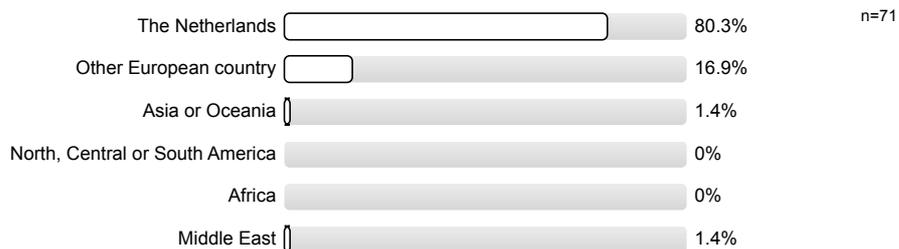
1.1) When did you graduate?



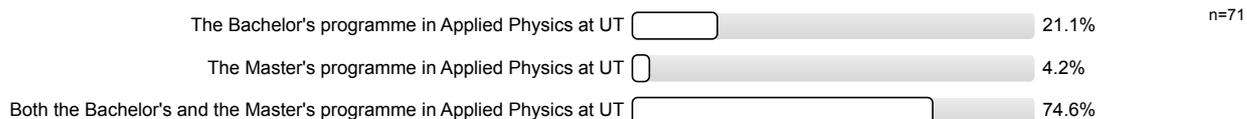
1.2) What is your nationality?



1.3) Where are you currently living?



1.4) Which programme did you complete?



1.5) Based on which study programme were you admitted to the Master's programme Applied Physics? The evaluation will not be displayed due to low response rate.

1.7) After finishing your degree in Applied Physics, did you obtain any other degree / qualification or did you participate in a traineeship?

| | | | |
|-----|--------------------------|-------|------|
| yes | <input type="checkbox"/> | 44.6% | n=56 |
| no | <input type="checkbox"/> | 55.4% | |

1.8) yes,

| | | | |
|---|--------------------------|-----|------|
| a PhD programme | <input type="checkbox"/> | 80% | n=25 |
| a university teacher training course | <input type="checkbox"/> | 0% | |
| a PDEng programme | <input type="checkbox"/> | 8% | |
| a traineeship in a company (longer than one week) | <input type="checkbox"/> | 20% | |
| other, please specify: | <input type="checkbox"/> | 8% | |

2. Current situation

2.1) Have you had paid work since graduating?

| | | | |
|-----|--------------------------|-----|------|
| yes | <input type="checkbox"/> | 93% | n=71 |
| no | <input type="checkbox"/> | 7% | |

2.3) What best describes your current situation?

| | | | |
|---------------------------------------|--------------------------|-------|------|
| I am employed | <input type="checkbox"/> | 66.2% | n=71 |
| I am doing a PhD | <input type="checkbox"/> | 23.9% | |
| I am self-employed | <input type="checkbox"/> | 0% | |
| I am a freelancer | <input type="checkbox"/> | 1.4% | |
| I am studying | <input type="checkbox"/> | 7% | |
| I have temporary / on-call employment | <input type="checkbox"/> | 0% | |
| I am unemployed | <input type="checkbox"/> | 0% | |
| other, please specify: | <input type="checkbox"/> | 1.4% | |

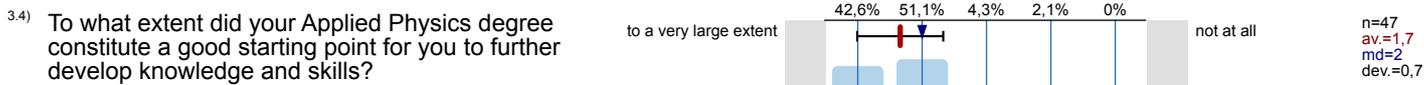
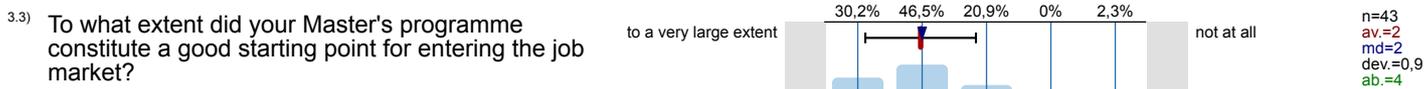
3. Relation between your position and your degree

3.1) Which **level of training** did your company / organisation **minimally** require for your current position?

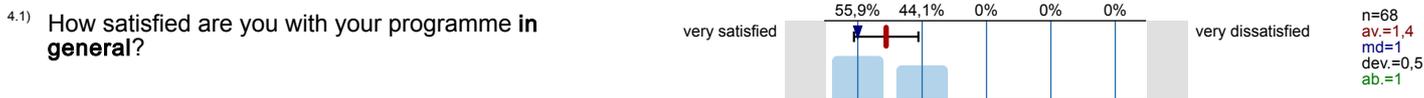
| | | | |
|---|--------------------------|-------|------|
| university (MSc), with a PhD programme | <input type="checkbox"/> | 10.6% | n=47 |
| university (MSc) with a postgraduate programme | <input type="checkbox"/> | 0% | |
| university, MSc | <input type="checkbox"/> | 61.7% | |
| university, BSc | <input type="checkbox"/> | 4.3% | |
| university of applied sciences (hbo), bachelor | <input type="checkbox"/> | 14.9% | |
| vocational secondary education (e.g. mbo) | <input type="checkbox"/> | 0% | |
| non-academic general or academic senior secondary education (havo or vwo) | <input type="checkbox"/> | 0% | |
| none | <input type="checkbox"/> | 0% | |
| I don't know | <input type="checkbox"/> | 8.5% | |

3.2) Which **field of studies** did your company / organisation require for your current position?

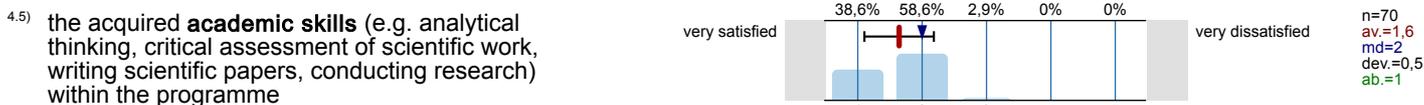
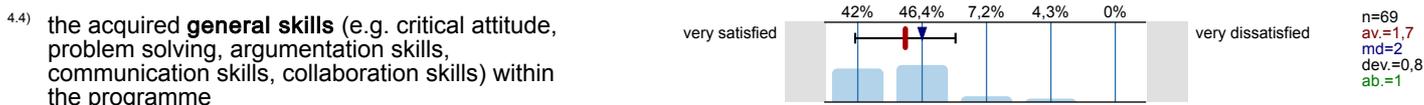
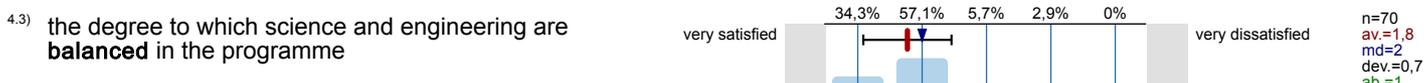
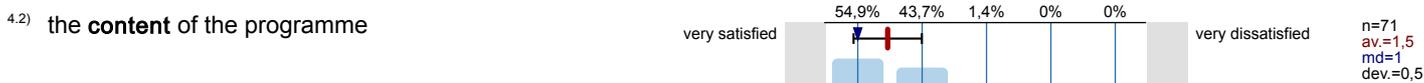
| | | | |
|--|--------------------------|-------|------|
| (Applied) Physics only | <input type="checkbox"/> | 4.3% | n=47 |
| (Applied) Physics or related degree programmes | <input type="checkbox"/> | 63.8% | |
| a completely different field of studies | <input type="checkbox"/> | 21.3% | |
| no field of studies specified | <input type="checkbox"/> | 10.6% | |



4. General opinion about your Applied Physics education

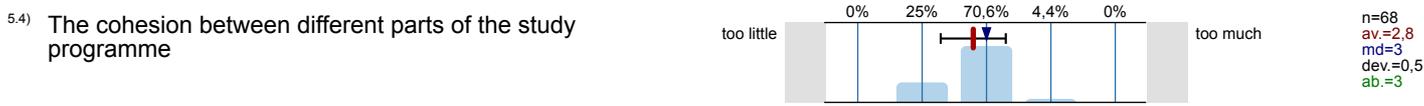
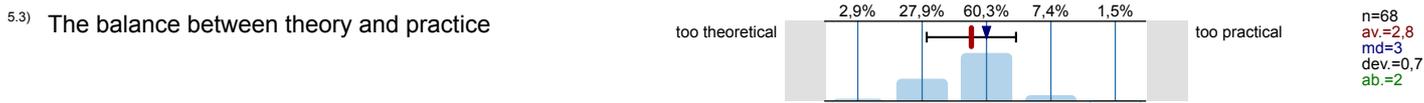
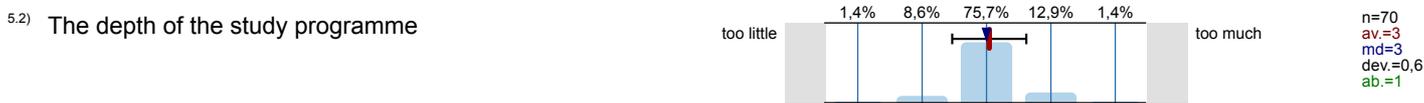
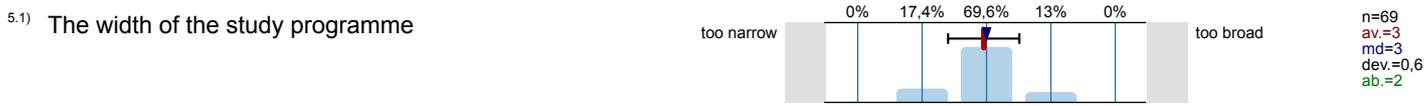


Please rate how satisfied you are with your Applied Physics education:

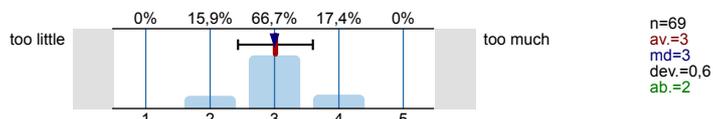


5. Content of the study programme

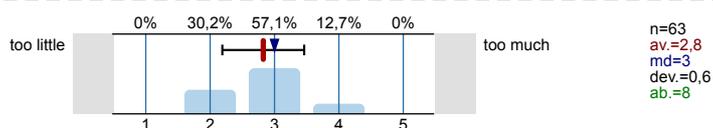
Please rate the following aspects of the Applied Physics programme (on a 5-point scale, where the middle is the optimal score):



5.5) The possibilities to tailor your own programme



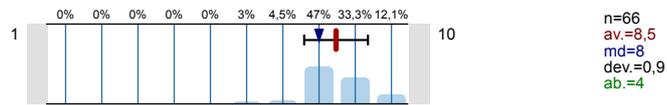
5.6) The international orientation of the study programme



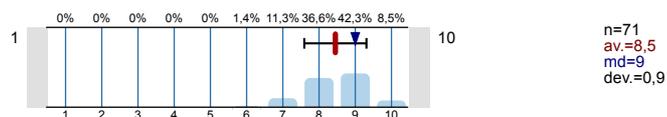
6. Quality of the study programme

On a scale of 1 = very poor to 10 = excellent, how would your rate the quality of the Applied Physics programme in terms of:

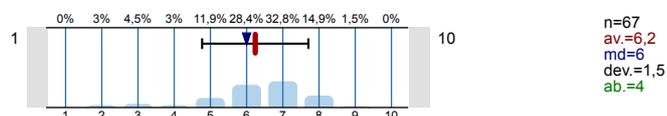
6.1) match to current scientific theories and research



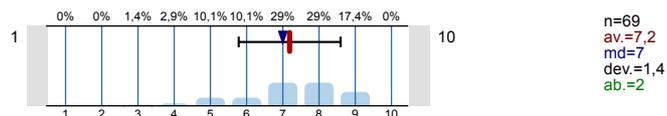
6.2) acquiring research skills



6.3) acquiring design skills



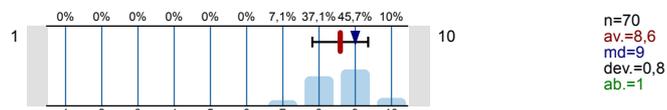
6.4) acquiring project work skills



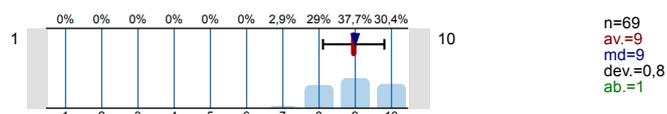
7. Quality of education and study guidance

On a scale of 1 = very poor to 10 = excellent, how would your rate the quality of the Applied Physics programme in terms of:

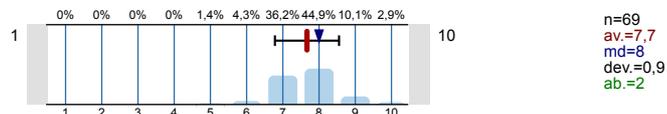
7.1) your lecturers' expertise



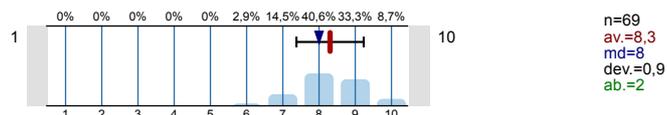
7.2) the accessibility of lecturers



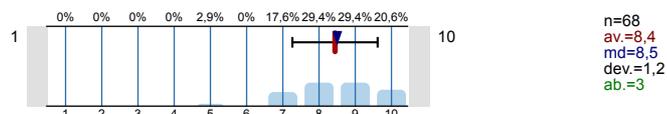
7.3) your lecturers' didactical skills



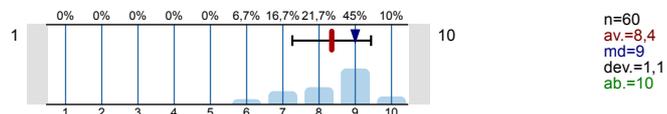
7.4) organisation of the programme



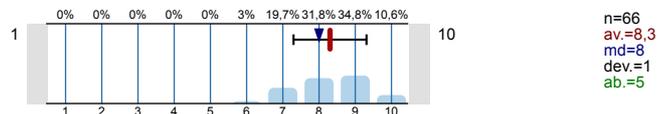
7.5) academic guidance / counselling



7.6) quality assurance / evaluations



7.7) information (about the programme, about rules and procedures, etc.)

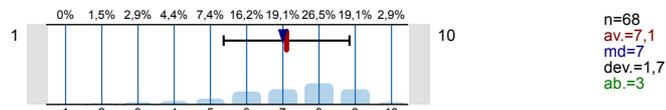


8. Career preparation

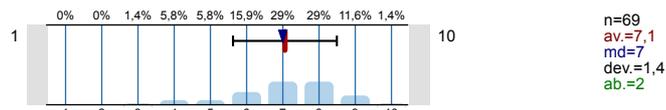
The following questions address career preparation, for example organised by the programme, by individual lecturers or by Arago (the study association for Applied Physics).

On a scale of 1 = very poor to 10 = excellent, how would you rate the following:

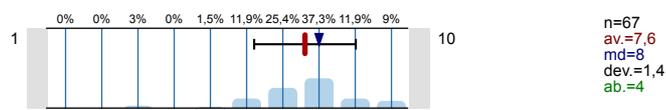
8.1) orientation on career opportunities



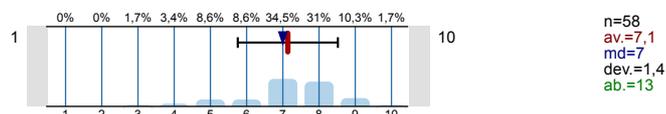
8.2) gaining professional skills during your studies which are relevant for work



8.3) contact with the professional practice (for example: internships, guest lectures, excursions and Arago lunch lectures)

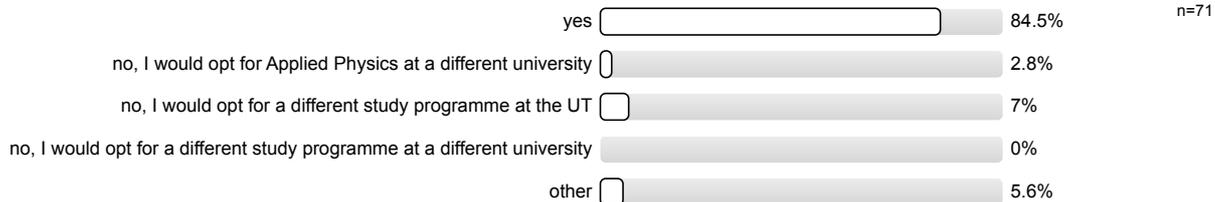


8.4) current knowledge of your lecturers concerning the professional practice



10. In conclusion

10.1) With hindsight, would you choose Applied Physics in Twente again?



Thank you very much for filling out this survey!

Click the Submit button to finish this survey.
 When the results have been processed, we will inform you about them.

Stefan Kooij,
 Programme Director Applied Physics

Comments Report

1. About you

^{1.6)} Please specify this programme:

The evaluation will not be displayed due to low response rate.

^{1.9)} Please specify this programme:

The evaluation will not be displayed due to low response rate.

^{1.10)} Please specify or explain your answers:

- - Graduated in Oktober 2020
- - Together with the master Applied Physics I graduated for ECB at the UT
- 1.1 I graduated January 2010 and continued with a MSc in Applied Mathematics
- After my bachelor's and master's in applied physics, I did the DTI track PDEng in Eindhoven University
- After my graduation I started a traineeship at ASML
- After the Bachelor's programme, I did the Electrical Engineering master on Microelectronics, also at UT.
- Bachelor's degree in applied mathematics from 2008-2010, physics bachelor in a fast track in addition to this in one year, 2011.
- Currently working on a PhD in physics
- First a traineeship with a company, and now I'm in a PhD program.
- I am currently working as a PhD student in Valencia, Spain. Subject: photoelectronic devices.
- I completed the Applied Physics bachelor in june 2020.
- I currently live in Switzerland
- I did a PhD at KTH Stockholm which was a continuation of my Master's thesis-work I did there
- I followed a traineeship in insurance risk. Part of this traineeship was to follow the AEMAS programme at UvA in order to become a certified actuary. The AEMAS programme consists of a pre-master Actuarial Science & Mathematical Finance, a master Actuarial Science & Mathematical Finance and a postmaster Actuarial Practice Cycle that gives permission to become a member of Koninklijk Actuarieel Genootschap, which grants the title AAG.
- I graduated from the bachelor's programme in February 2014
- I went to germany to work
- PhD in Physics at the University of Stuttgart (Germany)
- PhD programme in Applied Physics
PDEng in Business&IT
Traineeships in Data Fluency
- Regular student

2. Current situation

^{2.2)} How many months did it take you to find your first job, after graduating?

- 0 (34 Counts)
- 1 (8 Counts)
- 2 (10 Counts)
- 3 (4 Counts)
- 4 (2 Counts)
- 6
- 7

- 8
- 9
- 10
- 11

2.4) What is the name of your current position?

- (Semiconductor front-end) process engineer
- C++ Software Engineer
- Credit Risk Modeller
- Data Scientist (2 Counts)
- Data Scientist in the Energy Sector
- Data scientist
- Education Innovator
- Engineer (2 Counts)
- Financial markets treasury Derivatives sales
- Hardware Designer
- Junior technisch specialist
- Lead Data Scientist
- Lead Machine Learning Engineer
- Lead Quantum Engineer
- Manufacturing Engineer
- Mechatronic Engineer
- Petrophysicist
- Policy Advisor System Operations
- Postdoc
- Postdoc position (in the same group where I obtained my PhD)
- Postdoctoral scientist
- Product Manager
- Product developer
- Project leader
- Project manager at Thermofisher Scientific
- Projectleider
- R&D Engineer
- R&D Engineer Aerospace Thermal Control
- Radar Test Manager
- Research Engineer
- Research engineer
- Sales Engineer
- Senior Appliance Engineer
- Senior Consultant Financial Crime Analytics

- Senior Consultant Technology & Innovation
- Spare Parts Quality Engineer
- Strategy consultant
- Studyadvisor Applied Physics
- System architect
- Systems architect, engineer
- Technical consultant
- Technical salesmanager
- Trainee development (I Just started at this company 2 weeks ago, before I worked as a mobility consultant (adviseur mobiliteit) at movares)
- UX/UI engineer
- Wiskundeleraar

^{2.5)} Please specify your answers. I.e. depending on your answer to the previous question: Where are you doing a PhD? What kind of company do you run? Which type of work are you doing as a freelancer? What are you studying? What type of temporary or on-call work do you do?

- At the UT in the PoF group. Got the offer of doing a PhD after my graduation talk
- At the same research group as where I graduated (PCF).
- Continuing master in applied physics
- Currently following the AP master
- Delft university of technology
- Doing a PhD at the University of Twente.
- I am currently a PhD student at the University of Twente.
- I am doing a PhD at University of Twente.
- I am doing a PhD in theoretical physics at ETH Zurich.
- I study Theoretical Physics at the Utrecht University.
- I'm doing a PhD at the UT.
- I'm studying particle physics and astrophysics focusing on space plasmas
- Independent Software Engineer
- Master Energy & Environmental Sciences at the University of Groningen (RuG)
- My PhD is at Leiden University (Leiden Observatory).
- PhD Utwente
- PhD at Physics of Fluids group, at the UT
- PhD at UT
- PhD in Valencia
- PhD in quantum computing, TU Delft
- PoF, UT
- UT
- University of Twente

^{2.6)} Other description of your current situation:

The evaluation will not be displayed due to low response rate.

2.7) Please specify or explain your answers:

- After graduation I took some time to finish my paper, resulting from the Master's Thesis. Then took time off to focus on high-level sports, and then decided to pursue an industrial career over academic career. Once I started applying for jobs, it took me 3 months to find the right one.
- After my bachelor at UTwente, I did a master education at a different university. The time indicated in 2.2 is the time after my masters that I needed to find a job.
- Ape angewandte Physik und Elektronik
- As i stated above, I worked for almost a year as a consultant. 2 weeks ago I started my new job as a development trainee at Planon
- At a bank
- For mechatronic proto machines
- Function title does not fully cover my work, better instead is that I am part of the Mechatronic System Engineering department
- I actually had accepted a job offer 4 months prior to my graduation date as I applied for the job during my master's thesis.
- I first did a 4 year PhD, after which 1 year Post-Doc and then I became a technical consultant
- I have just completed a PhD (yesterday actually), and have already started a new job.
- I work at a bank and develop models to estimate credit risk.
- Ik had een baan gevonden voordat ik was afgestudeerd.
- Just regular
- My research topic is on the instrumentation side of astronomy.
- Sales/Marketing Manager/Engineer in a small scale up company. Many different tasks, so not a single name to really catch what I'm doing
- Within a start up we're building Machine Learning solutions for Tech start-ups and SME's
- Work in dealingroom in a bank
- after bachelor degree I went for a master in chemistry at the UT, followed by a phd

3. Relation between your position and your degree

3.5) Please specify or explain your answers:

- 3.2 my company requires econometrics / mathematics or related fields of studies
- 3.3&3.44 The best thing I learned during my studies:
 - analytical thinking
 - which steps to take when solving a complex issue
 - being used to work hard because a lot is expected from me.
 What I lacked was:
 - statistical knowledge
 - personal development, how to work together, how to speak up, how to sell your advice, how to present yourself and your ideas
 This is what I learned and never used:
 - all content topics
 - universities and applied physics specifically go to level of detail that is never reached in industry. This made me, but also other graduates I work with now, confused about when to stop an analysis.
- A general background in physics and some dedication opens A LOT of doors into different fields
- Aph is heel breed, bedrijven zijn eerder op zoek naar wb of el skills
- Applied Physics is seen by many employers as a very difficult, which helps a lot in finding a job in my field of interest (Machine Learning consultant) a few years ago. However nowadays there are many studies in NL that focus on Data Science / AI / Machine Learning and with the limited knowledge of that time about MachineLearning I'm not sure whether I was able to get a similar job again.
- Applied physics was too theoretical for jobs outside academia
- Companies have difficulties to understand what the capabilities are of an Applied Physicist and tend to see it as theoretical physics. Therefore they seem less interested than students from mechanical, electrical or chemical engineering. Though we are equally (or in my humble opinion, better) capable.
- I can't answer question 3.3, as I did not do my master's at UT
- I feel that option of a more business career focused route would be a valuable addition in the master track (compared to the program i followed)

- I found that as the level of depth is so high in the Bachelor and Master of Applied Physics, it can be difficult finding a job in industry with that same depth and challenge.
- I had No sales training but The physics background is The basis
- I rolled in the a PhD program from my thesis-work. Obviously for that I needed a Master's degree. Only after a post-doc I entered the job-market which was in a field for which I gained the expertise during my PhD. No formal requirements were on my education, but purely on my skills.
My physics skills I have developed during my Applied Physics studies have helped me significantly developing new skills in any field.
- I work in a semiconductor foundry. I regularly use the solid-state physics knowledge I have from my studies
- It is a good background to have to find a technical position
- It is a good starting point, although I felt I was missing too much information science, data science and programming (styles).
- More business and soft skills needed in industry/businessess is not much trained.
- Mostly the analytics skills and fundamental understanding of all kind of physics-related technologies.
- My master thesis was with the UvA in particle physics, most of my direct skills needed for my job I obtained e. E.g. python skills. Also, I need a lot of statistics knowledge, which I got from my maths bachelor. I think this is missing in the physics curriculum.
- Not so much the physics is needed in the job market, but rather all the useful things needed for doing applied physics, such as image processing
- Of course management experience was required as well, but the masters degree I got, enabled me to learn these skills quickly in an renowned engineering company (ASML) which, in turn, increased my career chances and opportunities in the direction of management.
- Physics serves as a nice base. It makes you suitable for a lot of jobs.
- The field in which I am currently employed is the field of energy systems in particular the high voltage grid. However, I am currently in a more political oriented function which requires analytical thinking (present from studies) but also a lot of soft skills and communication (not at all taught within the AP program) .
- The only thing I can use in a starting position at a company is the way of analytic thinking.
- The skills required for my work are much broader than physics, and do not require in depth physics. Instead the way of thinking and good experimental design/execution are important, plus software/analysis skills.
- Via LinkedIn I was found by a recruiter, based on the master Applied Physics.
- Working as Software Engineer you need logical thinking for which applied physics is a very good starting point. More specific physics courses (mostly in master) are less and less relevant for other fields.

4. General opinion about your Applied Physics education

^{4.6)} Please specify or explain your answers:

- As indicated in previous remark in my program there was little room for personal development aimed at general skills and a lot of focus on developing academic skills. Although this can be expected from a study at the university, it is a pity that there was little room for the general skills. But maybe I myself did not notice/recognise the opportunities that were there. :)
- Could have used more structuring of work to get to valid conclusions
- During my bachelor and master I would have liked more practice in academic writing. However I learned a lot of general and academic skills during my internship and my final master assignment where I got active feedback on my practical and written work.
- For general skills, I was missing a bit of reflection and feedback. For academic skills, we have never written a scientific paper, but I also think that should necessarily be included.
- Having done my master and now doing my PhD at ETH Zurich, I am in a position to compare the study programme at UTwente with one at a highly ranked institute in Europe. Some brief comments:
 - the bachelor in physics at ETH covers more mathematics and theoretical physics than the programme at UTwente. Courses that are similar (e.g. classical mechanics, electrodynamics, ...) typically go a step deeper and further at ETH. However, this to a great extent seems to be solely due to what might be called the "ETH disease": profs just wanting to cover more because they feel that ETH students should also learn this and that. My experience as a TA however is that only a small handful of students can actually keep up with this and really learn the physics. For most students it just means that they learn less physical intuition. One stunning example was electrodynamics, where most students knew all the formulae for using Green's functions to solve potential problems, but less than a quarter managed to find the electrical field of an infinite line charge using a Gaussian cylinder on the exam.
 - All in all I feel that UTwente did a better job at actually teaching physical intuition. (At least for most students.)
 - UTwente covers much more experimental aspects.
 - UTwente covers much more general and academic skills. At ETH this is almost completely non-existent. (Please don't get me started on the average quality of talks by master students...)
- I am honestly very satisfied on all fronts...

- I am so satisfied because I had the opportunity to very freely decide the courses I wanted (minor as 4 MSc courses, master loads of free ECs), in addition to core courses. Since the topics of free choice were topics I am interested in, I retain that knowledge best. In addition my internship was extremely valuable for practical skills.
- I feel like argumentation skills could be focussed on more. A part of a course where discussion is stimulated and where argumentation/discussion methods are taught could be a great asset. I remember a great setup for discussion of metaphysical papers during statistical physics, however the final form left much to desire. (Goed idee, jammer van de uitvoering) I do think the base idea of that course could contribute a lot to general argumentation skills for students.
- I have always been critical about the degree of "general skills" (particularly social skills) in the program. It cannot be denied that the average applied science student is not particularly skilled in this area. And I feel, for a university that prouids itself in preparing students for more than just the academic world, it would be prudent to teach these skills as well, because they are our achilles heel. I've made this clear to the faculty during my years at university, and the faculty listened; implementing more project courses and specific training in, for instance, presentation skills. What was still missing (although things might have changed in 6 years) was the actual review of those skills (i.e. tests, requirements to meet in bachelors presentations, or something of the sort), to make sure no student leaves with a degree, not having met the needs for good social skills as well.
- I think the balance between science and engineering is not really there. The only engineering you learn is within science. I can't use my knowledge of photolithography or assembling samples to a puck of a measurement system in a company.
- I think the courses in the new TOM model are more coherently related to each other than the curriculum I followed from 2009-2013 (we had to investigate the new curriculum as a task in preparation for the study trip)
- I think there could be spend more time (or maybe just more specific awareness) on the general skills. I think physicist have quite a particular way of communicating and argumentation that might not be the most convenient for people from a different background. A good starter that is already organized is the project together with applied mathematics in one of the modules of the bachelor.
- I would have been helped with more engineering knowledge and structured problem solving skills (8D, FMEA, SPC,)
- In hindsight I feel like there was a strong focus on physics and not enough on the "soft skills" (ugly word, but I guess you know what I mean by it)
- It has been quite some time ago, so this may not be very accurate. However, I never had many complaints in any aspect of the study
- More time should be spend on the physical meaning of the course material, rather than only the mathematics.
- Not much focus on communication / argumentation skills within the programme.
- Personally I found theoretical courses more interesting than experimental courses, since I rather do experiments than learn about them. So, in that respect I would have preferred more theoretical courses, and learn more experimental skills in the master assignment/internship
- Presentation skills and other soft skills could use a bit more attention.
- Soft skills could be much better.
- The content is extremely good but doesn't cover all areas of physics because it focusses on 3 general directions.
- please also check my free text on the previous question.
Im of the opinion that there is too much focus on the academic skills and not enough on general skills, especially more soft skills.

5. Content of the study programme

5.7) Please specify or explain your answers:

- 5.3. Too little what? Theory or practice?
- As per previous answers. More engineering focus would be useful
- Do note that I started my BSc pre-TOM
- During my study period the programme had a Optics, Fluid and Material track which had research groups with more and less applied research. Those topics were visible in the bachelor programme and there was oppertunity in the minor (in B-TN) and electives (M-AP) to tailor your own programme with courses I was interested in. (more in depth Optics and Fluidics during B-TN and Fluidynamics in mechanical engineering prospective during my master)
- Every bulletpoint that is off from the middle, is in my opinion only off by a very small margin. I am extremely happy with how the programme was balanced, only the workload was a bit too high in my opinion.
- I am actually really satisfied with all the things I learned and I think it is a great program. I only think that it is a really big step towards the company world.
- I guess the middle defines 'good' (at least not too ...'). I think the bachelor is quite wide, covering a lot of different physics aspects, and then more in depth on a certain topic in the Masters. Therefore I think the bachelor might be too broad, if you would assume that some people might only do a bachelor degree.
I think. I think the balance might be a bit more towards practice, e.g. more contact with companies, as internships are often still done at other universities, resulting in very little actual work experience/idea where to go after finishing your masters (if not going for a PhD).

- I really liked the opportunities that were available for an international internship
- I think the amount of actual practical work was rather limited, but this may have to do with the courses I chose. I think the possibility to tailor my own programme was very good. This also gave me the ability to tailor the width and depth of my study programme. The international orientation felt limited and not really promoted unless you look for it yourself
- Ironically, I think that my most valuable courses at TN and AP were the "theoretical" courses rather than the engineering courses. So, the "technische" part of the educational programme didn't have much value for me. I also felt a bit disappointed about how little math the programme had. Due to this I followed more courses
- So, I'm missing the middle (optimal) score, where I think I would've put most of these
- The "width" of the program is quite wide for an applied science program. Especially in the master program the different fields lie so far apart, I could barely follow the theses of students from different fields. However, I personally liked the degree of choice that gave me.
- The power of applied physics at the university of Twente is that the educational staff really support students to make their own choice possible.

6. Quality of the study programme

^{6.5)} Please specify or explain your answers:

- Although we have performed a lot of projects, theoretics on how to perform a project (as in the work field) is not provided.
- Apart from maybe 1-2 projects, I believe there were close to no design skills involved
- Back in my time (geez I feel old) the only real project course was P-Project, which is not nearly enough to learn and maintain project skills. If you messed it up (which I think my project group did, kinda), there was no opportunity to bring the lessons learned from self reflection into practice
- Depends on what 'design skills' are. I think you are taught how to design an experiment, but not really any product design for example. But that wouldn't really be physics I guess...
- I came a few years before a significant amount of project work was introduced to the program. So, although I feel it was lacking in my time, I cannot judge the current degree of project work I know has been implemented.
- I can only judge the Bachelor's
- I feel like a design part for a moving mechanical system could be a nice addition to the engineering part of the study. There are multiple programs the allow for these kind of designs or simulations
- I had only a final propedeuse project that we have to do in a group during our first year of the bachelor, but I learned a lot on project work skills during that period.
- I would recommend to look at some of the aspects of the Actuarial Practice Cycle that UvA offers for ideas on how to include more project work and focus on soft skills in your programme.
- Maybe i do not understand what design skills entail, but that also strengthens my point. I also feel that there was a lack of support in doing research. The quality is well monitored, but I now feel like I did not really learn to do research. I did research in such a way that there came some good results...
- Most of the research / design / project work is embedded in the internship and graduation project. In my case there was little design involved and hence the 'design skills' is low. However, I think it is a good thing to keep the practical points as design / project work seperated from the courses in the first. Such skills can only be learned by doing some actual work with close supervision. Please don't turn the master in a project oriented TOM-like system.
- Overall not much to comment on it. I'm not really sure what is meant with design skills
- Project work skills could be worked on a little more, because my experience was that a lot of students took too much time to finish there thesis assignment, often due to poor planning.
- Relatively little experience with designs from the ground up, or how to deal with more complex designs that may take multiple iterations
- The only larger colaborative project I've worked on was my bachelor thesis. Apart from that only limited smaller exercises.
- The problem with projects is that the proper education to improve the project based learning was not present.
- This is all learned in the second's year, so depends on your internship and master assignment I guess.

7. Quality of education and study guidance

7.8) Please specify or explain your answers:

- 7.3 didactical skills are dependent on the teacher.
- All lecturers were enthusiastic and helpful. Programme was evaluated, and I believe evaluations were followed up on.
- Although some professors really have good didactical skills (and would deserve a much higher rating), most of the teachers are quite poor in didactics. They compensate with their enthusiasm for the subject and outstanding knowledge, and therefore it is not a real problem. Though, judging the didactics on its own, I can not rate higher than a five.
- Compared to the university I went to after my bachelor's, there was very little general information about the programme available in a nicely accessible way. Compare: <https://www.ru.nl/studiegids/science/bachelor/bachelor-natuur-sterrenkunde/>
- Didactical skills sometimes 6, sometimes 10. Some lecturers could really improve a lot.. Overall pretty solid though
- I do not remember any issues and am overall very satisfied in this regards. I do remember however that sometimes a little more information might have been helpful
- In general, the faculty provided information where it was needed, and always tried to improve where possible. Which explains the general "high score" in these questions. The area I felt was lacking (and I know the faculty was aware as well) is the accessibility and didactical skills of /some/ lecturers. What I found was that the standard deviation in these areas was particularly big. On average, I think our faculty was better than other applied science programmes in the world, hence a 6 and 7 in stead of a 5 and 6. But it is important to note, that these are averages. Some teachers' door was always open, and some were absolutely. Fabulous teachers! But others were downright horrible at explaining things below post graduate level, while teaching in the second year. There were some that refused to talk to you in a normal fashion if they felt you did not understand their field well enough to their liking, did not like it enough, or made a "bad choice" in their opinion (for instance, missing a lecture, or following a course after failing the first exam). The lack of social awareness of these professors was staggering (albeit a great way to learn how to work with "difficult people"), and oftentimes came in a package deal with a complete disdain of teaching in general; an attitude of "I'm here to do research and select new PhDs, not spoonfeeding mere ignorant students". I am aware that this is common in the academic world, to the degree of becoming a caricature of university in pop culture. But nonetheless I feel the faculty (in honesty almost any faculty I've seen) could – should – be stricter on this behaviour. Professors should not just be required to teach alongside their research, they should be required to teach well! And if they are bad at that, there are courses, trainings, and plenty of other things, available to aid in this matter. If that doesn't work, or you fail to make use of them, even if you do some kick ass, money making research... Get. Out! University is just as much (more so!) a place of learning, as it is a place of research. A professor who can't do both well, does not belong.
- Most lecturers came from research groups but a good researcher is not directly a good lecturer.
For 1 or 2 courses a lecturer had to switch to english (in bachelor courses) because a international student was following the course. We could see a difference in content that was given during the lecture when it was given in dutch or in english.
- Point 7.3: This is a very important improving point in my opinion. There were teachers that are just not capable of teaching. This is a very important skill to have at least to a sufficient extent. Please do pay attention to the opinions of the students and act on their advices. The teaching professor should be able to spend time on improving their teaching skills! Arrange this.
- Sometimes digital lectures were not recorded, but thats a minor detail
- The guidance was excellent. I think the expertise of some lecturers was too good and sometimes I felt a gap between the lecturer and the students.
- The teachers and guidance are great. The small scale of the uni allows for a very personal approach and everybody is very helpful.
- When you ask, there is plenty of room to tailor the program to your liking, but not everybody is aware of this possibility
- Without the academic guidance of the study adviser I would probably not have finished my study. I also really enjoyed the accessibility and personal contact with lecturers. Especially in the Masters, it was very easy to access lecturers, ask questions or joke around with them in the hallways.

8. Career preparation

8.5) Many activities are organised by Arago (e.g. lunch lectures and excursions). If you think more should be done or the Applied Physics programme should develop (more) activities, please explain here to what extent and which activities:

- 'Student for a day' but for academic/professional positions
- Activities to get in contact with companies in the region. Like a snuffelstage but then for higher education.
- After I finished my internship, I've referred two other students that completed an internship at that place. I think relationships like that should be kept by the AP programme.
- Arago has a high added value to applied physics
- During my education it would have helped me a bit more to have gotten more insight in the connection with industry. The academic possibilities and perspectives are covered very well, but outside of Arago's (excellent) lunch lectures and excursions from and to industry, I didn't feel like there was much focus on industry perspectives. It's pretty clear that you can work at physics companies but I

think it would help to show how physics can apply to / help many other industries as well.

- Getting more practical projects from companies, instead of lectures from companies, would have been useful
- Hands-on career-preparing activities
- I almost never joined the Arago lunch lecturers and excursions, so before I would say there should be done more I should have gone to them
- I don't really think that Arago should do more activities but they should do different activities. The lunch lectures are often from detaching company's alike YER. I think those talks are not interesting at all, because you can always go to a detaching and than it doesn't really matter which one you go to because they all have the same working principle. For me it would have been really helpful to see where people end up after they finished the study and not have a talk about what's a detaching bureau or a talk from a recruiter of HR person. Also the 'bedrijven diner' was only focused on consulting. For me it would have been much more interesting to see all different kind of company's where you can end up and not only the obvious ones like YER or becoming a data analyst. In addition I would say that detaching bureaus can be mentioned but should not have a big part in preparing students for jobs.
- I have had little contact with Arago
- I think 1 Business practicum in the combined bsc and MSc is not enough
- I think it is fine the way it is (was?)
- I think it would have helped to get a broader view of where alumni work at the end, I really appreciated the talks of a few alumni but would be nice to have that every year of the study instead of only once.
- I think the curriculum I followed was mainly focused on an academic career. The lunch lectures and excursions organized by Arago gave more insight in the opportunities outside academia. I think the quality of the courses could benefit from for example a course related invited speaker from industry.
- I think the existing relation between the programme and Arago is ideal. Arago, as an association of the current students, knows best what kind of career information/preparation the current students want. Whilst the faculty keeps relations with the academic and commercial world of science, can provide funds if needed, and has some experience in "things students don't know they want to know", such as: there's more you can do with a physics degree than just science. I think it is very important for Arago to play a role in career development, as this enables –requires – students to work on this themselves. And at the same time, the cooperation with the faculty is imperative, given their experience and contacts. So, by all means, keep doing what you are doing!
- I think the level of career orientation by the programme is just fine as is, as of 2020. Let the programme keep its focus on the academic side and let Arago handle the industry side.
- I'm not sure if the programme should develop more activities, as I feel the current total (Arago + programme activities) is sufficient. However, be aware that the Arago activities will differ from year to year, and if the officer of external affairs is not a motivated person that year, Arago will organize much less lunch lectures or other activities. Extra activities from the programme could be organized in collaboration with Arago such that Arago is satisfied because of business contacts and contracts, and the programme can make sure a whole year attends. In my eyes that would be a perfect balance.
- It is still difficult to get to know what working in a company/less-scientific setting would be. Maybe a forum for parttime/student jobs or assignments at companies could help.
- Let Arago do it, this is more informal and accessible, feels less obligatory
- More business skills like: Pyramid principle, stakeholder management, Story telling with data as required part of your study
- No I think it was fine like it was during my Masters.
- The activities were already quite complete. The programme could maybe relate to professional practice during some basic lectures in the core directions of the applied physics programme (optics, fluidics, materials)
- The program is very research-oriented (which is fine), but a bit broader view (for instance with consultancy companies) would be interesting
- The programme could collaborate more with external partners

^{8.6)} Please specify or explain your answers:

- As a physicist you are trained in reverse engineering. With applied physics one might expect to be trained in some forward engineering as well, but this was fully absent during my study years. Forward engineering fits the professional world very well. Many physicists with a non-academic career end up in finance, IT, data science, consultancy, etc. Physicists are known for their analytical skills and the only thing they would need extra to be ready for aforementioned sectors is some information / data science and programming skills (and ofcourse data management).

The industrial world shifts towards a fusion of different fields and during my time at the UT it was a bit too monodisciplinary. A study as NanoTech and Advanced Technology is too shallow to step in adequately into one of the sections abovementioned.

- Don't forget that the master involves an internship (typically abroad) which can be done at a company and an internal master project. Both allow students to build up some form of professional network which they can also use to find or orientate themselves for a career. It is also quite common that a professor ask master students where they want to go after their masters and gives suggestions. Sometimes the prof even offers to use his/her own network for the student.

Such contact is a bit informal and surely it will vary between groups. But if present, such informal advice is valuable to students

- For 8.2, I think you learn a lot of skills which are relevant for work, but you are not always aware. The study could help with that.
- I did not really join these activities
- I really can't remember what the educational programme did on the orientation of career opportunities. I assumed the answer was "very little", hence my answer. In my opinion it is nice that Arago has an active role in the programme, but some things should be done by the programme itself. I don't know which activities per se (hence my non-response in 8.5) as it depends on what the need is of the current student population and the expertise that the current group of lecturers can provide.
- Knowledge about the current situation in industry is not something I expect from a lecturer
- Maybe there are different lunch lectures I should mention that I haven't visited all of them and that I know some of them are given by alumni of APH. But when I look back at the lectures the talks from YER and HR people just really annoyed me and that's what I remember the most.
- Most of the (Masters) study programme focusses on research and prepares you for a job in the academic world. I missed having the opportunity to work with a company as a student during my studies, especially because almost every other programme I know does have this, so I felt like I was a step behind other recent graduates.
- Professional skills were mostly acquired through extracurricular work done at Arago
- The 7 on professional skills relates to the same "soft skills" that were lacking in my day. I know much has improved in time, but this must remain important! In regard of 8.4, not many lecturers were really connected with the professional practice, other than academic research. I think this isn't necessarily much of an issue, as Arago, and companies themselves pick up this slack (given the need for our skills, they're coming to us if we don't come to them). But it's good that the programme rates itself on this scale, even though, currently, I don't see it as much of an issue.
- The programme doesn't really give much insight in the career opportunities. You will have to look for them yourself. However, the bedrijvendagen can be really helpful in that (so that's covered)
- There is not a lot of focus for professional skills, for example how projects are structured, how to setup deadlines etc
- for me there was no contact with professional practice as I ended up in a field that is not related on the content side, only on the mathematical background. I think its a pity that there are no opportunities within the program to also explore this more. I have given a lunch lecture myself to Arago after my graduation, so Arago is open to this.
- well AP, it is more focused on academic career paths, which till some extend is a natural thing. Regarding companies there could be more focus on industries apart from the high tech.

9. Strengths and points of improvement

^{9.1)} Are there any positives about the Applied Physics programme you would like to highlight or add?

- Access to graduate at high level research groups.
- After this elaborate list.... Not really :-P. Let's just say its one of the broadest programmes of applied physics in the Netherlands, both in tough skills as in major fields, and I think that is a great plus!
- Amazing staff with great people, keep it up. The cooperation between the staff and the students is great.
- Best staff ever, super well organized, very approachable hard working people!
- Definitely the personal atmosphere and the accessibility of all professors. I'm not sure if you can find such a personal environment anywhere else: i.e. the drinks and activities organized with students and professors, the informal relations between professors and students.
- Good critical thinking and analytical skills after the programme.
- Great relationship between the professors and students.
- I always liked the cohesion with fellow students but also with the professors. Everyone was very approachable.
- I consider the freedom I had to pick and choose courses, my internship (at Philips) and my MSc project the highlights of the course.
- I enjoyed the small scale of the programme (not that many students), and the accessibility of the programme staff.
- I liked the fact that doing an internship abroad was strongly encouraged and supported.
- I loved the many discussions!
- I think the broadness during the beginning of the Bachelor's along with the flexibility to tune the programme later on and in the Master's is very good. You can quite early identify where your interests lie and develop yourself in that direction accordingly
- I was very thankful for the guidance/advice/mentoring and flexibility I got. Many (larger) studies don't provide that.

- I would highlight the individual tough that the programme has for the students. I really appreciated that I could make my exams always in the morning due to personal circumstances. And I found also valuable to be able to be part of the education as student assistant.
- Individual tailoring of study program if you want to do extracurricular courses/other stuff, they tend to be very well cooperative
- Its a very robust program which has given me a good foundation for technical challenges
- Nicely challenging and nice atmosphere!
- Personal contact with the staff both of AP, but also the lecturers.
- Small, accessible and good facilities. Generally good lecturers/courses and good research groups for graduation assignment (thesis). Flexible and willing to support additional activities/courses elsewhere.
- The Bachelor and Master Thesis, basically everything around it. The equipment, the supervisors, the groups, etc. During my PhD I felt that many European academicians (even from high-end institutes) were amazingly shocked how mature graduates from Twente were.
- The Nano lab experience is a highlight
- The accessibility and approachability of teachers and other didactic personnel
- The applied part of this programme is extremely good! There is a lot of practice and projects! Additionally, the facilities are amazing. The campus is great and the labs are even greater.
- The bachelor programme is a really great, well balanced programme that sweeps you through the foundations.
- The educational staff of Applied Physics is that they help/support you to get the most out of yourself
The personal contact and always open doors and willingness to help
- The entire staff and programme was excellent overall, I am very grateful to have studied physics at the UT and it helps me a lot during my work, even though I ended up working outside of Physics.
- The fact that teachers are so easy to contact with questions felt like something special and unique.
- The general level of person completing the program.
- The individual attention
- The involvement and the 'benaderbaarheid' (dit is vast geen woord) of the board is really good.
- The people are amazing!
- The staff is great. Individual attention and attention to detail makes this programme shine.
- The theoretical knowledge was sufficiently varied and deep. I believe the program properly prepares for more work in academics
- There is (was?) a lot of flexibility
- high involvement of staff
- none
- the applied physics programme is a very demanding programme. I have noticed around my colleagues with backgrounds in econometrics, actuarial science, mathematics and other technical master programmes that the Applied Physics degree gives a sort of status that you have proven to be smart. My current boss and also my previous one were impressed by my cum laude graduation when I applied for the position.

9.2) Are there things you missed during your studies?

- As mentioned, an option to gear your masters more towards a career at a company instead of a purely scientific career.
- At some moments the cohesion between courses (i.e. Calculus 2 became more clear while being used half a year later in E&M). Like mentioned before I think the courses can benefit from invited speakers from industry.
- Data Science
- Didactics of the professors could be improved
More orientation on job possibilities
- General relativity, particle physics, plasma physics, tensor algebra
- I disliked the fact that Saxion (or other 'zij instromers') typically did not have the required background knowledge for the master. Typically they lack knowledge on statistical physics, electrodynamics and basic quantum mechanics. This holds back the lectures quite a bit during the master and is a source for unnecessary repetition in the various master courses.
- I would have liked it if there would have been some moments for feedback, for example after a presentation. Maybe also some reflection skills are nice to learn, that could help in finding a job that suits you.

- I'd have liked more elective courses or elective exercises within the programme
- In hindsight, I would have been helped by more focus on problem solving skills such as FMEA, 8D, and SPC. Also more practical projects in industry would have been useful.
- Insight in working practice outside academia (in addition to the internship)
- Links with industry. The business perspective and the design perspective that is related to engineering. Much was focussed on an academic career, while less than half attains this career path. Skills related to presenting, collaborating, designing and soft skills could have had more attention.
- Maybe a bit more practice in writing of reports
- Maybe a course focussing on writing of papers, academic publications (or let students write this more often for a project/practical)
- More soft skills
- More theorie to practice
- Not really, I think this is one of the best studies out there.
- Not that I remember
- Perhaps a better connection to the business side after the studies, but that's pretty much it.
- Practical non academic assignments from industry
- Preparation for the job market
- Project planning/ holding effective meetings/ effective presentation skills
- Relativity theory
- Slightly more focus on academic writing/presenting might be nice
- Some external collaboration would have been nice, to broaden your mind on how other universities / companies organise.
- The aforementioned social skills. Also I had a last-semester-crush on biophysics, which was absolutely fantastic. Wish I had known of it sooner! (maybe that's already changed since 2014)
- The workload makes the programme a worthy and valuable degree, but it also can break will power completely and cause burn-outs at a young age. This should be monitored extensively. Compared to other studies at other universities, this one has a fairly high workload.
- What I found out now when I'm in industry is that we have limited knowledge of software tools like: Comsol or SolidWorks etc.
- Work related, business opportunities / contact with companies
- none
- see previous answers, mainly focus on soft skills
- so far, no
- soft skills, communicative skills

9.3) Please specify or explain your answers:

- At the program you're educated and prepared for being a scientist and when looking for a job and finding out which position suits you, the skill of being a scientist is not gonna help you.
- It's been a long time ago
- Study has changed a lot with the TOM model, I believe this has improved some of my concerns. It used to be more classical academic education (hoorcollege-werkcollege), while for industry working together and learning through engineering is maybe even more important. But the content and atmosphere was great.
- We had firs linear algebra and I didn't know where we need to use it for until we got quantum mechanics the next year

10. In conclusion

10.2) Why would you choose Applied Physics at the UT again?

- All in all its a great study that adds to my own interests

- As mentioned before, the applied part is perfectly balanced with the theory. The facilities are magnificent.
- Because I can now see how much I benefit from having studied Physics, having gained the analytical skills
- Because I've enjoyed it a lot!
- Because of the great atmosphere and facilities.
- Because of the way the courses are thought, the relationship between the students and professors, the extra curricular activities which can be done.
- Best education I could have wished for, especially considering the possibilities besides core studying (and how there was room created for that)
- Best match for my interest, nice overall experience
- Even though my content preferences have changed (towards theoretical physics), I am very content with everything I learned at UTwente. Overall I feel that the bachelor has prepared me very well, also for a further career in theoretical physics. Comparing to ETH, I am very glad I did my bachelor at UTwente and not at ETH.
- For the same reasons I did the first time: more than a good career opportunity, or a fascinating field of study, I wanted to embark on physics because I was fascinated by how the world works. I still am, and wouldn't want to miss it. Also: the analytical way of thinking I was taught has become an integral part of my being, and I would not know who I would be without it.
- Good and interesting study
- Good atmosphere on campus.
- Good guidance, clean environment, close contact with teachers and supervisors. If it would be more theoretical and more demanding, I would follow the same study again even after having obtained my diploma's.
- Great program.
- Great programme!
- I
- I didn't know what I wanted. Applied physics provides a solid basis for solving complex issues in any working field. The content specific knowledge you can always pick up later. It is this way of thinking that makes applied physics a decent education. I like the UT because of the atmosphere, small groups where it is possible that the teacher knows your name, staff is very accessible and open to feedback.
- I enjoyed it very much
- I enjoyed my time and was able to develop myself very well.
- I had a good time in Enschede :)
- I had a lot of fun and gain expertise
- I had a wonderful time and gained an immense amount of knowledge/analytical skills
- I had an incredible time, during my MSc. & PhD at Pof. Highly recommend it To everyone
- I learned a lot, and it was generally very enjoyable
- I loved it there!
- I loved the program and all the things I learned in it. It was a great experience and I look back at it with very good memories.
- It brought me where I am right now, and I like where I am right now.
- It feels I achieved an education that is highly useful, and I managed to find a field I like working in.
- It is a strong Knowledge basis
- It provides a good technical foundation that you can apply in many different professions during your career
- It was a great programme and together with my time in Enschede as a student all together (Arago included) I would definitely make the same choice.
- It was very interesting and a nice environment to study. Well-organised, small and easy to approach people.
- It's a very strong education programme that is worth a lot for your future career, both on paper (getting job interviews) as in practice (actual skill usage)
- Its good and dutch

- Liked the studies, still very much like physics.
- Loved the program, the people and my options for work after
- One of the best studies to prepare for your professional career, in any field of work
- See previous questions. Though I would opt for a larger focus on Data Science related items.
- Small scale, informal study with very good guidance and flexibility. Good facilities and outstanding research with related opportunities
- Solid foundation for many direction in industry as well as for research positions.
In consultation with mentor/study guide there is ample room for tailoring courses during master.
- The ability to quickly grasp intricate complex structures and understand interactions between systems, is something I fully credit the AP programme for.
- The content, the location, the people, the atmosphere
- The great atmosphere and the commitment of lecturers and students together to achieving a top-level programme, mainly. Also, the depth of the Master's programme allowed me to develop a deep interest in physics.
- The programme has good facilities for practicals, has a close relation between research and education in their programme and has an eye for the individual student.
- Unique campus atmosphere and quality of research groups.
- Where it has brought me. Also because of the great experience as described before. To be really fair, I sometimes play with the thought of choosing Civil Engineering. But what can I tell 11 years later... So far, my experience with AP has been great!

^{10.3)} Why would you opt for Applied Physics at a different university? Which university?

The evaluation will not be displayed due to low response rate.

^{10.4)} Why would you opt for a different study programme at the UT? Which programme?

- I think I'm more interested in processes/management, so a master industrial engineering and management. However, I don't regret my choice, also very happy with applied physics :)
- In hindsight I would have opted for theoretical physics I think, but if I would choose for Applied Physics, I would definitely choose for Twente again! I hated leaving Twente, but the specialisation that I wanted to do was not taught there :(
- In the end I didn't think physics was a good match. Probably Mathematics, Electrical Engineering or Computer Science.
- More interested in chemistry. Applied physics is to much modeling for me.

^{10.5)} Why would you opt for a different study programme at a different university? Which programme and which university?

The evaluation will not be displayed due to low response rate.

^{10.6)} Other, please specify:

- I do not know if I would again choose AP, however It is also not a no.
- Opt for a different study, undecided whether it would be at the UT or else. It would probably something be with DataScience / AI.
- Probably would, but would also consider something more engineering like, like werktuigbouwkunde.
- Yes, for the bachelor. No, for the master. The master was not the best choice for me.

^{10.7)} Do you have any final remarks or suggestions?

- All my comments are there to make the program and arago even better than they are now. I just have a difficult time finding out what company and function fits me and I know that more students have this struggle, so I think that this is a thing that can be improved in the future.
- I do feel the workload is quite high, both in B-TN and M-AP, but this might be necessary to achieve the quality of both programmes. If you know what you sign up for, I think they are great programmes.
- I loved my studies at UT, and apart from the few points I mentioned I'm very happy with my choice!
- I would chose UT again because of the university itself.. quaint campus, extracurricular activities..
- Keep the program as strong as it has been. I've encountered people who graduated 20 years ago who still benefit from the skills gained

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- Nah.
 - No
 - Nope
 - Stay dutch, youll learn english on the way
 - Thank you for giving me such a good educational basis and the personal contact and support during the study!
 - Thanks a lot for everything and I wish nothing but the best for the physics programme. I'm proud to be an alumnus!
 - The experience gained from the various study/sports committees/boards is extremely valuable. Especially in hindsight I have learned as much from these as my physics courses.