

Disclaimer

This brochure is made with care, we strived to make all the information complete and correct. However, imperfections caused by human mistakes can occur, which is why we can not guarantee de correctness and completeness of the data that is shown.

Contact details CH

Opening hours

Monday from 13:00 until 17:00

Tuesday until Friday from 9:00 until 17:00

Adress

Mekelweg 4
2628CD Delft

Phone number

015-278 2532

Email

General - board@ch.tudelft.nl

Education - education@ch.tudelft.nl

Website

<https://ch.tudelft.nl>



Wiskunde
Informatica
Studievereniging



Introduction

The minor is a cohesive collection of courses worth a total of 30 ECTS credits, accounting for six months of your studies. You take your minor in the first semester of your third Bachelor's year. You are entirely free in your choice of minor. It therefore provides an appealing opportunity to look beyond the bounds of your own discipline.

Over the years, we have noticed that the general information about minors was not always in line with the experiences of our students. Therefore we composed a brochure with the experiences of our Applied Mathematics and Computer Science students. In this brochure you can find general information about following a minor and a number of student experiences. This way we hope to give you more insight in the possibilities that the minor offers you.

We want to improve and update this brochure every year. If you have followed a minor that is not yet included or have different opinion on a certain minor, contact us at education@ch.tudelft.nl.

Good luck with choosing your minor!

Kind regards,

Iris Kooijman and Thomas Oomens
Commissioners of Education
W.I.S.V. 'Christiaan Huygens'





Practical information

Overview of TU Delft minors

On the right you can find an overview of the minors at TU Delft that are open to Applied Mathematics and Computer Science students. All thematical minors of the TU Delft are taught in English, excluding the minors: Educatie, Ondernemerschap: Med-Tech Based Entrepreneurship, Ondernemerschap: Technology Based Entrepreneurship and Security, Safety and Justice.

Bridging minors

A bridging minor offers students the possibility of admission to a Master's programme other than their general Master's (the Master's degree programme in the same discipline as their Bachelor's degree programme). A bridging program often requires more than 30 EC and is therefore not always possible as your minor. Contact the relevant faculty for advice.

Minor at another university in the Netherlands

If you want to follow a minor at another university, this minor must be accepted by the exam committee of your degree program. Minors at the other universities of technology are usually accepted. Make sure to check beforehand whether you may be admitted to the minor of the relevant university. If so, you must register at that university too.

The TU Delft has a minor cooperation with Leiden and Erasmus. The minors at Erasmus University Rotterdam (EUR) constitute to 15 EC in total. Following two EUR minor is not possible and the options for doing electives there is small, so it is advised to follow electives at TU Delft. Minors at Leiden University are worth 30 EC, but are not clustered in the first semester like in Delft. Information about this is available in the study guide of Leiden University.

Minor	Faculty	For AM?	For CS?	Selection
Advanced Prototyping	I0	✓	✓	
Airport of the Future	LR	✓	✓	
Biomedical Engineering	3mE	✓	✓	✓
Communication Design for Innovation	TNW	✓	✓	
The Delta Expert: water for the future	CiTG	✓	✓	
Companies and innovation: economical, ethical, juridical and safety perspectives	TPM	✓	✓	
Educatie	TNW	✓	✓	✓
Electrical Sustainable Energy Systems	EEMCS	✓	✓	
Finance	EEMCS	✓	✓	
Medicine for Engineering students	→ EUR	✓	✓	✓
Heritage & Design	BK	✓	✓	
House of the Future	BK	✓	✓	
Integrated Infrastructure Design	CiTG	✓	✓	
Interactive Environments	I0	✓	✓	
International Entrepreneurship and Development	TBM	✓	✓	✓
Mathematical Finance	EEMCS	✓	✓	
Modern Physics	TNW	✓	✓	
National Geo information minor	→ VU	✓	✓	✓
Offshore Wind Energy	LR	✓	✓	
Ondernemerschap: Med-Tech Based Entrepreneurship	TPM	✓	✓	
Ondernemerschap: Technology Based Entrepreneurship	TPM	✓	✓	✓
Projectmanagement from Nano to Mega	CiTG	✓	✓	
Responsible Innovation	TPM	✓	✓	
Robotica	3mE		✓	✓
Security, Safety and Justice	TPM	✓	✓	
Software Design and Application	EEMCS	✓		
Spaceflight	LR	✓	✓	
Sports Innovation	I0	✓	✓	
Sustainable Communities	CiTG	✓	✓	
Sustainable Design Engineering	I0	✓	✓	
Transport, Infrastructure and Logistics	CiTG	✓	✓	
Zeiljachten	3mE	✓	✓	

Study Abroad

The minor Study Abroad gives you the opportunity to study at a foreign university. Experience abroad is seen as beneficial to your university education and personal development. The spots at other universities are limited, so you will be selected based on study progress, grades and motivation. It is required that you finished all your first year courses.

Preparing for a minor abroad starts early: six to nine months before your departure. Firstly, you need to decide where you would like to study by selecting three universities. Information about possible universities is available on studyabroad.tudelft.nl. Check if you can create a coherent set of courses worth 30 ECTS and make sure there are no language restrictions for you.

Contact the International Office EEMCS for the next steps in your application process. Be sure to check the deadlines. The internal selection deadline is generally in January. Within a month you will hear if you are selected for one of your choices.

Create your own minor

TU Delft offers plenty of carefully compiled minors. Should you however choose to create your own minor, than you must submit your well-founded application to the Board of Examiners of your own Bachelor's degree programme. This demands a high degree of independence and ample preparation time. Also take into account the requirements that need to be met for your degree programme itself. Personal timetables can be compiled in BlackBoard in the tab My Student Info, under 'My Timetable'. The timetables will be finalized by mid-August.



Deadlines and registration

March 16 - April 30	Registration Education Minor
May 2	Minor Event
May 3 - May 31	First registration period
July 1 - July 31	Second registration period

All above data are also mentioned on minor.tudelft.nl.

Website

The information in this brochure gives you a short overview especially for AM and CS students. More information about minors is available at minors.tudelft.nl. This is the ideal starting point to explore the possibilities a minor offers or to check more details of a certain minor. Also updated information about registration and deadlines is stated here.



Student experiences



Name: Tim van der Lippe

Study: Computer Science

Minor: Airport of the future

When: 2015-2016

Hi, I am Tim van der Lippe. At the moment of writing third year Bachelor student Computer Science and this year I followed the minor Airport of the Future.

The choice of my minor was a process of elimination. Most of the minors at the TU Delft did not appeal to me, whereas this minor did. Airports and aircraft have always interested me. The minor focused on the organizational tasks of an airport, as well as the limitations as a result of aerodynamics and characteristics of aircraft. Aerodynamics and material from the Aerospace Engineering major is very briefly touched upon. The difficulty of the material in the minor is not too hard. Compared to my Bachelor Computer Science, the amount of time required is significantly lower.

While working on the minor, I primarily had the feeling I was back at high school. We had to write several reports, analyzing published material of companies and perform predefined work. It was not a real challenge compared to the challenges provided during the Computer Science bachelor. For me it



Name: Jacqueline Zijdenbos

Study: Applied Mathematics

Minor: Abroad in Australia

When: 2015-2016

Hi! My name is Jacqueline Zijdenbos, and I am a 20 year old, third year Bachelor of Applied Mathematics student at the Delft University of Technology. From July till December 2015 I did a Minor Mathematics abroad at the University of Melbourne in Melbourne, Australia.

At first, I wasn't sure what I wanted to do with my minor, but going to Australia has always been a dream. I chose the country, got accepted into Melbourne, and later figured out which subjects I would take. It is also possible (and probably easier) to decide in which direction you want to do your minor; Doing mathematics, computer science or something completely different? And choose a good university to go to afterwards.

I did another semester of mathematics. Mathematics would be a course I feel confident in, even in another language. It gave me an opportunity to see other sides of maths. Most of the subjects I took are not taught in Delft, so they would broaden my knowledge. All were approved by the exam committee, so they were of a sufficiently good level.



The University of Melbourne is an amazing university that is pretty similar to the TU Delft. There are a lot of different courses, cultures and lovely people. Even with the high standards in Australia, as a TU Delft student you can follow all the courses quite well. And if you ever have any problems, friendly Aussies will help you out. Balancing studies, social life and living in another country by yourself can be challenging sometimes, but if you're determined to make the best of it, you will.

Exploring the world down under has been an amazing experience. So if you are interested in meeting new people, exploring other cultures and learning something about your (or another) field in a completely new setting, than studying abroad will definitely be something for you!

Minor Abroad

Coordinator: Jitske van der Laan

Mail: exchange-eemcs@tudelft.nl

Faculty: EEMCS





Name: Chantal Olieman

Study: Computer Science

Minor: Abroad in Lissabon

When: 2015-2016

Ever since I started studying I have wanted to go abroad. Not to a specific country, but for the sake of getting away, experiencing new things and meeting new people!

My university was a technical university as well, but unfortunately the bachelor's courses were still taught in Portuguese, thus I decided to take master's courses. I was able to pick any course I liked, but there could not be too much overlap with my courses here of course. Unfortunately my courses were not very hard or time consuming. I only went to the university once a week and barely studied at home. This was convenient for traveling and having friends/family over, but sadly not so challenging.

Other than just studying a different subject, I lived in a different country, met different people and experienced multiple different cultures. A part of the learning in this minor is self development instead of gaining academic knowledge. Therefore the goal of this minor differs in my opinion a lot from a regular minor program.



If you are ready for a new adventure and willing to leave some things behind in exchange for a new experience, I would denitely recommend you a minor abroad!

For any questions you can always contact me or read my blog at <http://chantalolieman.weblog.tudelft.nl/> (in Dutch).

Minor Abroad

Coordinator: Jitske van der Laan

Mail: exchange-eemcs@tudelft.nl

Faculty: EEMCS





Name: Kevin Visser

Study: Applied Mathematics

Minor: Biomedical Engineering

When: 2015-2016

Well, hello there. My name is Kevin and I am currently a 23 years old Master student Applied Mathematics. A few years ago I decided to do the Minor Biomedical Engineering, a Minor mostly given by Material Engineering and Physics professors. I decided to do so, because I wanted to do a Minor which had practically nothing to do with Mathematics and to do something slightly out of my comfort zone. Important to note is that I had already followed a course at Electrical Engineering about Electricity and Magnetism which helped at some points.

During this Minor you will follow courses about several areas in Biomedical Engineering. You will for example a course about how machines like an MRI or a CT-scan work. You will learn the physics and mathematics, e.g. Fourier Transformations, behind this. Other courses teach you about the materials uses during hip replacement surgeries, or about how muscles, tendons and joints work. During the Minor you will have the opportunity to be present at an autopsy, or to have a guided tour at the AMC in Amsterdam to see the earlier mentioned machines in real life.



In the second quarter you will do a large final project worth 12 EC in which you put the knowledge learned in the first quarter to use. In the year I was doing the Minor, some people developed a special kind of bed for infants called CloudCuddle and are currently starting a business. I did a project commissioned by the Dutch Forensic Institute. Unfortunately I am not allowed to say much more due to a Non-Disclosure Agreement.

I would say that every Mathematics or Computer Science student should be able to follow the Minor. If you are interested in doing a Minor in the medicine area combined with some technical aspects, this Minor is for you. If you are looking for a doable, mostly stress-free Minor with enough time left for a social life, this Minor is for you.

P.S. It is awesome to say you've developed a machine that is currently used at several Dutch Forensics Institutes.

Coordinator: Dick Plettenburg

Mail: d.h.plettenburg@tudelft.nl

Faculty: 3mE





Name: Daan Rennings

Study: Computer Science

Minor: CDI

When: 2014-2015

Hi! My name is Daan, I'm a 21-year-old CS student. During my third year in Delft I followed the minor 'Communication Design for Innovation' at the faculty of Applied Sciences.

When I was looking for a minor, I already knew I wanted to focus on business rather than an engineering subject, to complement my prior education in CS. Though, I did not want to fully focus my minor on starting my own company, neither did I want to spend time on juridical and safety procedures, so the minors at TPM did not really appeal to me.

CDI on the other hand had a specific focus on the influence of communication in sociology, psychology and marketing, which I found quite interesting. Maarten van der Sanden, an assistant professor in Science Communication and the coordinator of the minor, is a great guy who is serious about communication and knows all about it. It's also good to know that the programme was not that though: only one exam and many group exercises gave me an easy time during my minor.



Furthermore it's nice to see your knowledge in CS comes in hand in the group projects: from creating a simple webpage to actually being able to think of the digital side of the business. The projects therefore gave me a nice experience of what a(n easy version of a) career in consultancy would look like, since we had a full time group assignment for a company (the start-up strategy of the TU Delft Robotics Institute in my case) throughout the minor in the C-Lab.

So, if you are looking for something completely different from the education you got at EEMCS, want to know more about the world of communication, collaboration and marketing based upon science and want to work in a team during your minor, CDI is your minor to go!

Want to hear more about science communication? Recently, one of our most famous alumni, Ionica Smeets, started a scientific career in Science Communication in Amsterdam, she explains why in her piece 'Professor wat zegt u nu' in 'de Volkskrant'.

CDI

Coordinator: dr. Éva Kalmár

Mail: e.kalmar-1@tudelft.nl

Faculty: TNW





Name: Angelica Babel

Study: Applied Mathematics

Minor: CDI

When: 2016-2017

Hello! I'm Angelica, I'm a 21-year-old. This year I'm determined to finish my bachelor Applied Mathematics. Next year I'm planning on starting my double degree master, Applied Mathematics and Science Communication. The reason why I want to do a master in Science Communication has everything to do with my minor, Communication Design for Innovation.

In my search for a minor, I was looking for something very different than mathematics, something with communication and psychology. Looking hard for a minor and looking at interesting names, I found 'Communication Design for Innovation' (CDI). The name looked very interesting, so I took a closer look.

The name, CDI, already states the purpose of the minor: Learning to develop a communication design for an innovative process. On the website the different courses were stated and the words 'communication' and 'psychology' were very important to me. I read the whole page and I was ready to start this minor!

The first week we started off with a small introduction and what the purpose of this minor is by Eva Kalmer (the minor coordinator) and Maarten van der Sanden, the teacher of the C-lab course. We had to do a test, which told us what kind of person we are in a group project and with these results multidisciplinary groups were made.

We had three courses, Psychology and Sociology in Social Networks (SPSN), a course on



behaviour within social networks, Communication Marketing for Innovation (CMI), a course about communication on a marketing level and C-Lab, the course where we had to solve a so called 'ill-wicked' problem within a real company.

C-lab was the most inspiring course I had ever done. Each group had a real case from a real company they had to solve. My case had everything to do with the civilians of Noord-Brabant and the upcoming environmental law. My group had four people from industrial Design, Applied Physics and Computer Science. It was so new for me to work in a group with all these different people, who don't think the same as me. (My way of thinking after two years of hardcore mathematics: 'What do I need to proof. What can I use to proof it? Proof it'). Using our different backgrounds and our different way of thinking, we developed a communication strategy and made a tool making use of the different theorems from the courses. It was very fun to learn how communication takes place in an innovative process.

If you want to do something with communication and you want to work for real company to solve a real problem? Than CDI will be a good fit for you! You will also get new friends along the way. Maybe you will as excited as me and we will see each other at the master!

CDI

Coordinator: dr. Éva Kalmár

Mail: E.Kalmar-1@tudelft.nl

Faculty: TNW





Name: Mireille Kauwenbergh

Study: Applied Mathematics

Minor: Education

When: 2015-2016

Hey! In the first semester of this year I followed the minor Education in Delft. I'm very excited about this minor and that's why I want to tell you something about it.

My name is Mireille Kauwenbergh, 21 years old and a third year student Industrial and Applied Mathematics. This year began with my minor and at the moment I'm working on my end project to finish my bachelor, it's about modeling traffic networks, but that's not what this text is about.

First let me explain to you why I chose the minor Education. In the middle of the second year I started to look for a minor. Many of my friends wanted to study abroad, but I just wanted to stay here in the Netherlands. First I considered to do the mathematics minor, it's called the Minor Finance, but when I saw the minor Education I immediately knew I wanted to do that. I wanted to have a break from college and learn how to teach other people mathematics. So I signed up for this minor and arranged an internship at a high school not far from my home. In August the adventure started!!

The first six weeks I had two days a week lectures about presentation skills, teaching skills, pedagogy and other courses you needed to be a teacher. We



also had to give small lessons to other students, this was very educational because they gave you feedback and you could learn from their presentations. Besides, you instantly had a group of friends during the minor. Two days a week I was at the high school to get to know the school, my colleagues and the students. Mostly I observed other teachers, but sometimes I gave a lesson myself. The last day of the working week I did my homework. We had a lot of paperwork to do and prepare for the lessons.

After those six weeks I got my own classes and gave a lot of lessons myself, more than sixty! I noticed how easy I could teach mathematics, because of my study. Other minor students had to learn the mathematics books, because they had forgotten the contents. The children also have a lot faith in you, they believe you know everything about math. I loved to work with the children and teach them all the things they needed and wanted to know.

I would recommend the minor Education for everyone who wants to teach mathematics, wants to work with children, isn't afraid to give a presentation and wants to have a great time during the minor!

Education

Coordinator: Martin Jacobs

Mail: m.a.f.m.jacobs@tudelft.nl

Faculty: TNW





Name: Max Spanoghe

Study: Computer Science

Minor: Education

When: 2015-2016

I am Max Spanoghe, studying Computer Science and currently in my 3rd year Bachelor. In this year the curriculum involves doing a minor. For me this was the perfect opportunity to explore other things besides programming and algorithms. I like Computer science but my interests are quite broad and thus I began searching through all the minors that are available. First I thought the minor of Electrical Engineering would be quite interesting in combination with my studies, but then I stumbled across the Education minor. Since I love teaching, this is the minor that I chose. In secondary school I loved teaching hard topics in an easy way so that my fellow students would understand them. Furthermore I coached some younger students when I was in my last year of secondary school. In the minor, I had the option of teaching either Mathematics or IT in the junior classes of secondary education. Since IT is closest to my own studies my preference went to this course.

The quality of the minor was quite high and the workload was not low. In my opinion, if you want to fulfill this minor with high grades you have to put the time and effort into it. The courses in the minor were very informative.



The internship at the school even more so. The most interesting insight I remember from this semester is the fact that even the easiest concepts of Computer Science can be hard to explain in a comprehensive and clear manner. Explaining young children the concepts of loops, variable assignments, sprites, objects, events and so on is quite challenging. The gratification when this succeeds is enormous. Besides the didactical courses you also get pedagogical courses in which you learn how to get students to work, how to measure progress and how to lead them. In addition to this, you take a course on your presentation skills. This course was very instructive and applicable to my own studies in courses like Seminar (where I got an 8.5 for my presentation).

For a student in Computer Science this minor is very fun to do and relates to your own studies. I would recommend anybody with a passion for teaching to look into this. It might boost your career and you get the opportunity to be responsible for a class get them excited about our most beloved sciences.

Education

Coordinator: Martin Jacobs

Mail: m.a.f.m.jacobs@tudelft.nl

Faculty: TNW





Name: Judith Leijenhorst

Study: Applied Mathematics

Minor: ELPT

When: 2015-2016

Hey, I'm Judith. I'm currently in my third year of my bachelor Applied Mathematics.

Last semester I followed the minor Economics, Law, Philosophy and Technology. It was quite an experience, for a math student. Here at EEMCS studying is all about getting to understand the theory and practicing exercises, but in this minor was different. I had to read articles, and studying just meant reading more articles.

Something more about the content this minor. The economics part speaks for itself. The law courses were all about laws around technology and how technology changes the law. I found this quite interesting, although I didn't pass all the courses. The last part is about philosophy, only one course of 2.5 EC. Maybe philosophy sounds boring and abstract to you, but this course differed from my expectation. We didn't learn about the old philosophers, but we talked about the ethical part of technology; how far can you go? Is it okay to alter DNA? What will the consequences be?



We also had an Integration course, where all those subjects are intended to come together. This year it was about logics, and as a math student I really liked that.

I chose this minor because I was interested in the law around technology, but I wound up liking the philosophy and the economics courses more. I think some interest in Law is a requirement for this minor, and wanting to know how the economical world works does no wrong.

It is not the hardest minor, there was a lot of students who also followed another course of their bachelor, including me.

The Minor changed from Economics, Law, Philosophy and Technology to Companies and innovation: economical, ethical, juridical and safety perspectives.

ELPT

Coordinator: Dr. F.W. Guldenmund

Mail: f.w.guldenmund@tudelft.nl

Faculty: TBM





Name: Hans de Munnik

Study: Applied Mathematics

Minor: Finance

When: 2016-2017

My name is Hans de Munnik (20) and apart from trumpeter, I am a student of Applied and Industrial Mathematics at the University of Technology in Delft. I chose the minor Finance because I was very interested in the economic and financial side of mathematics. That's because I like to use mathematics to solve real life problems; what's fun in theory and abstract mathematics if you can't use it? If you have this same interest as me as a student in Delft, you can choose between the minor Mathematical Finance or Finance.

If you apply for the minor Mathematical Finance, you have to pass an entrance test to get accepted, this is not the case for the minor Finance. Mathematical Finance has a lot of overlap with the existing TW program, which causes problems for your curriculum. And in addition, the minor Finance focuses also on subjects and topics not related to mathematics.



This gives you a good idea of finance in the current society and which role you can play in there. The minor has very diverse courses, but in the end all courses are based on the stock market, shares and assets.

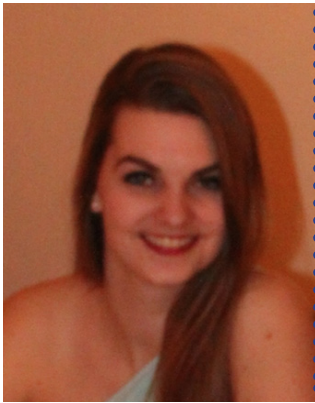
Finance

Coordinator: Dr.ir. L.E. Meester

Mail: L.E.Meester@tudelft.nl

Faculty: EWI





Name: Noor van Ruyven

Study: Computer Science

Minor: Finance

When: 2016-2017

Hello, my name is Noor and I'm a 4th year Computer Science student at the TU Delft. For my minor I chose the Finance minor.

I chose this minor because in my first year I started out as a Mathematics student, but soon realized that Mathematics at the TU Delft was way more theoretical than I thought it would be and I really didn't like it. So I switched to Computer Science within the same year. Even though I'm glad I switched, I do still like Mathematical courses, so for my minor I decided to choose courses in that field, also to check whether I made the right decision switching studies.

I have to admit, I thought it was quite a difficult minor. You have a lot of different courses at the same time and all of them have their own either weekly or monthly hand-in assignments, so you were really living deadline to deadline. The teachers and classes were really good, but it was a lot of new information at once and it was often so that the information you learn in one week, you had to control the next for a graded assignment, so if you fell behind it was even more work. But the minor was really nice nonetheless!



I'd say you have a small advantage with a Computer Science background, though most programming you do is in Matlab, which we don't use much, but you're able to learn quite quickly. Other than that, it is really useful to have had the Probability and Statistics course from the second year, because multiple courses use that knowledge.

So all in all I'd recommend this minor to people who have a bit of financial knowledge already, who are good at and interested in Mathematics and who are good at keeping up their studies each week.

Finance

Coordinator: Dr.ir. L.E. Meester

Mail: L.E.Meester@tudelft.nl

Faculty: EWI





Name: Paul Verkooijen

Study: Computer Science

Minor: MedTech Entrepreneur

When: 2016-2017

Hi everyone! My name is Paul and I'm 23. I study computer science, I am working on getting my bachelors degree. In my free time I row, I love to hang out with friends and have a few beers.

This year I did the MedTech-based entrepreneurship at the faculty of Technology, Policy and Management (TBM in Dutch). When I chose a minor, my main priority was a minor which had as little computer science or math in it to change things up a little bit. I especially wanted a minor which would lay more focus on how to operate businesses and social things, like presenting yourself or ideas, and working in groups. Finally, since my interest in biology, care and wellness I chose the MedTech variant over the Tech variant.

When the minor started, we had one half year project. During this project, you begin your own start-up with a group of 3 to 4 people. This start-up should be some product or service that is useable in healthcare. This project is supported by other courses. The knowledge gained from each course, should be used in the project. Some courses taught us about healthcare, its economics and how to measure it. Others focused on design and doing research for your product. Some things I've learned are finances, brainstorming, designing, working in groups and pitching. Only a few weeks were



really time consuming due to deadlines, but most weeks you had loads of free time, in which you can work on your start-up.

I would recommend this minor if:

- You want something completely different than Computer Science or Mathematics. It is not a difficult minor, but you will learn a lot of things you will need at EEMCS.
- If you like a creative minor. One course is from industrial design, you have to do a lot of brainstorming, think about how to promote and sell your product and so on.
- If you are interested in starting a start-up.
- You like working in groups and everything that comes with, like giving presentations, having meetings and writing reports.
- If you want a really social minor. Every course you work with the same group, so you never have to work alone.
- If you like having a lot of freedom. I had only a few classes a week, of which only one was mandatory. The rest of the time you can work with your group on the different projects, but these times are not planned and are your own responsibility that you do something useful with it.

Coordinator: Drs. J. Spaans

Mail: j.spaans@tudelft.nl

Faculty: TBM





Name: Sven Popping

Study: Computer Science

Minor: Modern Physics

When: 2016-2017

I'm Sven Popping, 4th year Computer Science student and I'm 22 years old. This year I did the minor Modern Physics. Why did I choose this minor? The real reason was that wasn't selected for my first choice. This meant I had to select a minor that was still available in the second registration period. Well that ended up being the minor Modern Physics.

At AS (Applied Sciences), they work with a systems of octals instead of quarters, so this means that you will have two exams every five weeks instead of the habituated three exams every ten weeks. This means studying quite a lot every week to keep up with the courses. At first I thought this was horrible because I was not used to it. The advantage is that you do not have to study extra for an exam, because everything you need to know is still fresh in your memory.

The level of difficulty differs a lot per course, because your following a few first-year courses which are still a little bit high school like. The courses contain a lot of mandatory lectures and tutorials and it is likely you will pass these courses.



But the other courses are quite hard, because they expect you to have a background knowledge or knowledge from first or second-year courses and these need a lot more effort.

One main disadvantage, if you are an international student, is that some courses are given in Dutch and some material for the courses is only available in Dutch.

But if you are interested in topics like Theory of Relativity, Quantum Mechanics, Thermodynamic and are quite good at math then this Minor is probably a good fit for you.

Oh, and you can do experimental with liquid nitrogen.

Coordinator: Gertjan Broekman

Mail: g.j.broekman@tudelft.nl

Faculty: TNW





Name: Maarten Vonk

Study: Applied Mathematics

Minor: PHD

When: 2016-2017

Hello everyone,

My name is Maarten Vonk, I'm 21 years old and I'm studying Applied Mathematics. This year I'm doing a minor in Psychology of Health and Disease (NL: Psychologie van Gezondheid en Ziekte) in Leiden and that's what I want to tell you about.

I chose this minor because I wanted to learn more about people, understanding people and knowing why we think and do the things we do. I'd say that goal is pretty much accomplished, I'm not as far as I wished I would have been, but still a lot further.

In this minor I also learned a lot about mental disorders, stress and about myself.

This minor doesn't have a lot of scheduled hours. So it's mostly working at home and attending colleges, there are also a few courses in which you'll have group meetings.

The minor, on average, is not very difficult. For me the most difficult thing to



do was being able to work with discipline. I tend to procrastinate a lot when I should be studying at home. But on the bright side, this year I was confronted with that, because I had to work at home a lot. So now I learned how to deal with it.

Psychology is very different from Mathematics and Computer Science.

I think it's good for people like us to learn more about Psychology.

So, if you're interested in Psychology and you want to do something different from the Beta studies in Delft for a change, maybe this minor would be the right choice for you.

One final thing. This minor is spread over the entire year instead of the first half. But I realized, a bit too late for me, that this minor can be combined with the minor 'Mind and Brain', then it's all in the first half of the year.

Good luck and enjoy your minor!

PHD

Website: www.leidenuniv.nl

Faculty: Sociale Wetenschappen





Name: Eva Anker

Study: Computer Science

Minor: Robotics

When: 2015-2016

I'm Eva Anker (20 years) and I did a minor Robotics at 3mE for my bachelor Computer Science.

In this minor, we worked in a multidisciplinary team with one Computer Science, one Electrical Engineering, one Industrial Design and two Mechanical Engineering students to build a robot.

The first half of the minor I mainly had some courses from Industrial Design and Mechanical Engineering and the second half we mainly built the robot.

The subjects of the courses was not that interesting, but it was nice to see what other studies learned. In our group we made a guide dog who could autonomously cross streets, but there were also other robots developed, for example mosaic- or insomnia-help- or raspberry picker robots.

I chose this minor, because I'm interested in robotics and I liked the fact that I was in charge of all the programming in this project. Supervising the others seemed like a good learning experience.



The minor is a lot of work, mainly because all other group members think they can program, but they can not. In the last week there is a lot of pressure on the Computer Scientist, because everything except the software is finished. Some parts can only be made/tested when the robot is finished.

In the second half of the minor, my main job was to program the robot. Most groups use C++ with usage of the Robot Operating System. Because of all the programming, I could use a lot of knowledge from my bachelor. The programming was something we had to figure out ourselves, with help of a coach (every group was assigned a coach).

Overall, I liked the minor. Building a robot was a lot of fun and working in an interdisciplinary team was very instructive (other values and thus opinions). I would recommend this minor to all Computer Science students with affinity with robots and whom like to work in a team.

Coordinator: Prof. dr. ir. Martijn Wisse

Mail: m.wisse@tudelft.nl

Faculty: 3mE





Name: Erik Wesselius

Study: Applied Mathematics

Minor: SDA

When: 2016-2017

Hi there! I'm Erik and I'm 21 years old and in my third year of the Bachelor Applied Mathematics. At the beginning of the year, I was very enthusiastic to start my minor Software Design and Application. I chose this minor, mostly because I had a great time studying for the courses 'Introduction to Programming' and 'Algorithms and Data structures'. Here I learned that I like to program algorithms and small games.

Since I'm an Applied Mathematics student, I was not allowed to have OOP in my minor. Thus, I chose Signal Processing instead. After the first three weeks, I concluded that Computer Graphics isn't my thing. So, I created my own minor. I kept Computational Intelligence and Web and Database Technologies, because those courses intrigued me. Furthermore, added Logic Based AI and created a 3-quarter minor.

The way I chose my minor was based on the given minor Software Design and Application, I took away OOP by adding Signal Processing, which is often done by Applied Mathematics students. Also, Signal Processing is one of the more mathematical courses in the Computer Science bachelor. Because I did not like Computer Graphics and the fact that it's one of the main courses in the practical, I needed three new courses. I chose Image Processing, because I really



liked Signal Processing and wanted to know more. I liked Algorithms and Data structures, so I chose Algorithms Design. At last I liked Computational Intelligence, so I wanted to know more about the course before it, Logic Based AI.

In the first period, I noticed it was hard to follow both courses at the same time, because the lectures were at the same time. Luckily, both teachers were flexible and they postponed my sign in assignments. So, that was convenient. They also gave me two opportunities to take the exam, because they were on the same exact time.

In the second period, I noticed that it was quite hard to follow Algorithms Design, due to the lack of Java knowledge. The essence of the course is easy to follow for Mathematics students, but the practicum is hard and I needed a lot of help to understand the syntax.

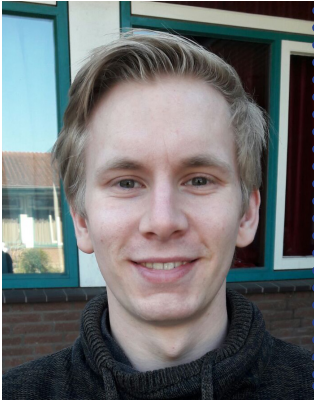
Signal Processing and Image Processing were by far my favorite courses, due to the mathematical influence and the fact you needed to program in Matlab instead of Java, I had a great time. Here you get to use everything you learn in the practica. We even learned how to recognize music, even if the quality is compromised.

Coordinator: Georgios Gousios

Mail: G.Gousios@tudelft.nl

Faculty: EWI





Name: Sigur Gouwens

Study: Applied Mathematics

Minor: Spaceflight

When: 2016-2017

Hello, I am Sigur Gouwens. A third year applied mathematics student who followed the minor Spaceflight.

The reason I chose for this minor is because I was always fascinated with everything that is in the night sky. I wondered why some stars sparkled, what they are made of and why they do what they do.

Because of this, the course 'Astronomical Exploration', was a very enjoyable course. Every week you learn about another subject. For example, it's explained how the age of the universe is determined. But also how black holes form and what happens when you fall into its event horizon. And a little closer to home: during the lectures on planetary science, the solar system is discussed. You will find out that it has changed over the years, and how this is known by looking at the composition and masses of the planets.

This is not all, spaceflight is a lot more than just astronomy. Sometimes people are more interested in getting there, sometimes to stay close to earth for earth observation but also to get to other planets. These topics are discussed in the courses 'Earth Observation' and 'Spacecraft Technology'. In the first course, methods to observe our own planet are taught and once you know how it works you can make your own measurements. I measured the change in vegetation over a period of ten years in Europe. But the possibilities for this assignment are



almost endless. For this you do need to use a very specific programming language but it will work eventually.

During the course 'Spacecraft Technology' you learn about almost all aspects of a rocket and how they work. A very important part is that a rocket or satellite knows where it is and what its orientation is, otherwise it will be hard to reach its target or make its observations. Next to this and different propulsion methods, a lot is taught in this course and after this you will be a true rocket scientist!

There is also the course Spaceflight assignment, here you can choose a space project by yourself. Plenty of these require programming skills (C++) to correct bitflips caused by the radiation of space, but also to predict orbit changes using numerical methods. There are topics in pretty much all directions so there will also be one for you! And yes. You can also build a water rocket if you like to be creative.

But, this minor is not an easy one! There are weekly assignments to be handed in, sometimes up to four so the workload is high. Because the minor is fairly new, there are still many things that need to be improved. One of these things is the distribution of workload. Another thing is that they seem to favor online lecture you have to watch yourself, but if you don't mind watching most of your lectures on Collegerama, it should be fine.

Spaceflight

Coordinator: ir. J. Bouwmeester

Mail: Jasper.Bouwmeester@tudelft.nl

Faculty: AE





Name: Emiel Rietdijk

Study: Computer Science

Minor: SSJ

When: 2016-2017

My name is Emiel Rietdijk, I'm 24 years old and I pursue a bachelor degree of Computer Science. Last year I have chosen to follow the minor: Security, Safety and Justice. This minor is part of Public Administrations of both the TU Delft and University of Leiden.

The year I had to choose my minor the news had a lot of impact on my choice. Lately there has been a lot of attention given to safety and security issues. Not only are there issues with terrorism, but there had been a lot of data leaks by companies, even really big companies. This made me want to know more about how this could be prevented and how companies can let this happen. I stumbled upon the minor SSJ and this appealed to me.

The minor has about the same difficulty level as a normal study, but it is way different than I was used to. The first thing was that the lectures were mandatory, but on the other hand there were only two days of lectures. Furthermore the practical assignments were all about writing papers, which I was not used to do. Besides the two days of lectures I needed about two days



of working on papers en preparation for the lectures, which gave me about the same time schedules as my bachelor.

As a student of Computer Science this minor was totally new to me and there was barely anything that I had seen before in my bachelor. The way the lectures were given, the practical assignments and the study material were all different. However, this gave me new ways of thinking and it has improved my skill of writing papers, which always comes in handy.

I would recommend this minor to people who are interested in how companies and governments handle safety and security issues.

Coordinator: Dr.ir. W. Pieters

Mail: W.Pieters@tudelft.nl

Faculty: TBM





Name: Tom Harting

Study: Computer Science

Minor: TBE

When: 2016-2017

My name is Tom Harting and I'm a fourth years Computer Science student. During my board year at CH, I found out that I really like to be my own boss and the entrepreneurial challenges that come with that. This is why I chose to do the minor Technology-based Entrepreneurship at TU Delft.

In my experience, the minor gives a good overview of what it is like to be an entrepreneur. It does this by introducing a central project in which you work together with your team to come up with a business idea and a business plan. All the courses surrounding the project are meant to help you with this, for example courses on brainstorming or financial management.

In my experience, the workload for the minor is a lot lower than that of the Computer Science bachelor, as was the difficulty of the courses. I didn't use a lot of the skills that I learned during my bachelor in this minor, since the product that you worked on needed to be a physical object (so no software product).



In general, I think the minor is fine. There were quite a lot of organizational problems, but those were partly due to the different teaching techniques which are used at TBM. I would recommend this minor for students who obviously have some kind of affection with entrepreneurship, who are not afraid to go out and talk to a lot of people about your project, who don't mind writing reports and who don't mind following courses that aren't 100% planned out. Also, I would say that you learn quite a lot in the minor as an EEMCS student, but that it isn't that difficult.

TBE

Coordinator: R.A. Kievit-Brinkman

Mail: r.a.kievit-brinkman@tudelft.nl

Faculty: TBM





Name: Eveline de Swart

Study: Applied Mathematics

Minor: TIL

When: 2015-2016

My name is Eveline, I'm 21 years old and in my fourth year of the Applied Mathematics Bachelor. I followed the minor Transport, Infrastructure and Logistics (TIL).

One of the main reasons I chose the minor TIL was because I am interested in logistics and from what I understood from the description this minor was a combination of mostly Civil Engineering and a little Technology, Policy and Management. However, this turned out to be the other way around. Besides the fact that the distribution of study fields turned out different from what I expected, the focus is mostly on transport and infrastructure and barely on logistics. I could have known this if I had looked up the subjects in the study guide.

I considered the group project in the first week the most interesting part of the minor. We had to come up with a design for the improvement of the train station Delft Zuid. This project was introduced by someone from the municipality and our ideas were sent to the committee working on Delft Zuid



so they could possibly use them in the actual improvement of the station.

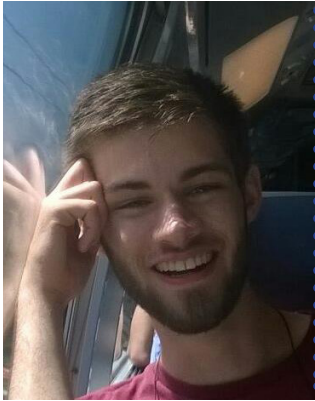
In my experience, the minor wasn't very challenging, especially in the mathematical area. Most of the subjects don't contain math and if they do it is a lot easier than what I was used with AM. Throughout the semester you have several projects which aren't extremely difficult, but can be very time consuming. Compared to AM you don't have a lot of contact hours, but the spare time is necessary for these projects. For all the projects you are working on, you have the same group which makes the distribution of the work easier. This minor turned out to not be the best choice for me, but if you want a minor with somewhat less mathematics and a lot of group work, it might be the right choice for you.

Coordinator: Dr.ir. John Baggen

Mail: j.h.baggen@tudelft.nl

Faculty: CiTG





Name: Menno Looman

Study: Applied Mathematics

Minor: Zeiljachten

When: 2016-2017

Past period I, Menno Looman, attended to the minor 'Zeiljachten'. I'm a 20 year old student in my third year from the bachelor Applied Mathematics. The minor isn't obvious for a math student. In my year, out of the 50 attendees, two were math students. Even more important, I didn't even know how to sail. I personally chose it because I wanted to do something different than mathematics, to do a big group project, and to build something instead of only modelling it.

For a math student, the first week is the hardest. The course 'Inleiding Maritieme Techniek' is a recap from the Physics we had in high school applied on sailboats. The rest of the first quarter is doable for every student on the TU. Here you learn the basics about how you can calculate everything, you learn how to use a 3D program 'Rhino' and to model a sailboat. This is an awesome skill to have! A few disappointments for me you need to know: you don't use your mathematical technics, teachers integrate strange, use strange variables and reason with "We think it is small, so take $k=0$ ".

If everyone is happy with the projects, you take this group to the second



quarter. In this quarter, you're going to work on the large minor project: The 'modelzeilboten race' and two lab assignments. In between the work there will be excursions and guest speakers. Then the brainstorming for the race begins. You model (and calculate!) your ideas. Give it more detail. Lasercut the easy parts. 3D print the difficult parts. Build your whole model and finally race at the Marin. There we raced against nine other TU Delft teams and four RMU teams. The race will take the whole day, you get a tour, drinks and you can invite someone. We won the race by far, something I didn't believe was going to happen if you asked me six months ago.

Zeiljachten

Coordinator: Lex Keuning

Email: J.A.Keuning@tudelft.nl

Faculty: 3mE



