

**Exchange university**

Delft University of Technology (TU Delft)

Degree programme

Applied Physics - Exchange

A Dutch journey through the obscurity of Quantum realm

Before departure

I believe that the broad overview gained during master's studies so far at KTH could be consummated only by a further exploration in a field of my interest particularly inclined towards Theoretical Physics at a place rich with the research culture. My decision to choose T U Delft was purely based on the expertise that the university has gathered in my field of interest, that is Quantum Computation and Information.

Alongside a strong feedback from the previous exchange students at T U Delft that the academics being very challenging and competitive, I was expecting to engage in any research project with some brilliant faculty at the Applied Physics Department of the university.

Being an international student at KTH with a foreign nationality, I had to apply for a resident permit in The Netherlands. The application was taken care by the university administration and I had to provide them with necessary details and sufficient credentials, and it was not a problem at all to process one. Alongside the health insurance that was being offered by the KTH, I had go through a mandatory tuberculosis check upon arrival in the Netherlands as subject to my nationality at a health center.

Upon arrival

Due to prior academic commitments here at KTH, I couldn't attend the welcome ceremony for all incoming students for the year of 2019-20 organised by the university and unfortunately that included a weeklong get-together activity with meet and greet events. I heard from other international friends that attended the events that students were divided into groups and each was given a challenge each day for points and the winner was picked based on the team that accumulated most points on the last day.

Besides the general international greet ceremony, I could attend the introductory session organised by the Faculty of Applied Sciences with all the new students joining the faculty. The session included, a formal introduction of the faculty members, support staff and all necessary members. Also, a quick review of the course structure, grading system was provided by the Faculty Head and since, my courses were approved by the university and KTH ahead on my Study plan, there wasn't much to take for me.

Financials

I received ERASMUS Exchange scholarship through KTH for the period I was planned to study at T U Delft that is from September of 2019 to January of 2020. The scholarship was 400 Euros for each month. The city of Hague where I lived was generally more expensive than Sweden and my expenses ended up spilling over the scholarship budget. Other than the expenses on the study materials and academic textbooks, I had no other payables at the university. Although the membership at the Faculty Student Union was free, I chose not to join as it wasn't mandatory, and I didn't find it useful in any particular way.

Accommodation

The accommodation as in almost every other student city in European is not particularly easy to find within Delft and it posed the biggest challenge before I left to the Netherlands. I tried several Facebook groups and online rental platforms to secure a contract but ended with no positive result. Finally just about 20 days before I was set to leave to the Netherlands, I wrote to the university as a desperate

move to secure through any contract if they could offer one. The administration were very swift in response as they understood my situation as an international student with possible relocation for several months and offered me a shared suite in the Hague, the nearest city to the Delft as all university held apartments were either occupied or granted to other international students in the Delft. The rent was not cheap either as I had to pay 560 Euros per month which was clearly more than my scholarship amount, but I chose to bear the additional burden as I had no other option for accommodation. I realised; I was not in a better situation than my some of my other faculty students who faced similar problems with accommodation. I can only hope this improved in the coming days. So, my simple advice would be to start looking for a student apartment shared or a private suite as soon as the decision comes through to avoid any last-minute trouble like the one that I had to go through.

My house at the Hague was a shared suite with two other international students. I was lucky to have both my room mates from different nationalities as it helped to engage and learn from folks with diverse cultural background. The commutation from the Hague to Delft is not a heckle at all as I lived very a block from the Hague train station and journey to Delft station is about 8 min with trains running every 25-30 minutes. I never had to face any issues with the travel as it was just one station away with an exception to track delays on few occasions.

University and studies

T U Delft is one of the leading academic institution in the world and in Europe owing to its vast infrastructure and vision. The faculty I chose, Applied Physics in particular is the best in Quantum Information and Communication with state-of-the-art facilities and brilliant teaching and research faculty.

My typical day would start off with my regular morning train ride to the university from the Hague, lecture hours-based day's schedule with each lecture no more than 2 hours including a break of 15 min after each hour. Following lectures, I would spend most of my time at the university working on Problem sets or assignments to cope up with the demands of the challenging academic curriculum. This opinion varies from faculty to faculty and I believe it also largely depends on the courses that one chose to take, and I was not ready to hold no bars in my choice in study plan and took all the tough ones. Besides that, all master's courses are offered in English and it was not necessary for me to take any language courses.

Courses

Code	Title	ECTS Credits
AP3421	Fundamentals of Quantum Information	4
AP3421-PR	Fundamentals of Quantum Information-Project Course	2
AE4890-11	Planetary Sciences – I	4
CS4090	Quantum Communication and Cryptography	5
CIE4510	Climate Change: Science and Ethics	4
WI4156	Game Theory	6
AP3032	Continuum Physics	6
WI4430	Martingales, Brownian Motion and Stochastic Calculus	6

The above table provides a detailed list of all the courses that I registered towards while at TU Delft. My primary focus through the exchange studies remained in Quantum Information and Communication and I followed all the courses in the Quantum Track of Applied Physics faculty. I was

particularly enthusiastic of the Project course as it enabled me to practically some of the Quantum Algorithms into a real Quantum Computer and see its operation for myself. The project was in a group and we had a great collaborative team of three that assessed one of the prominent Quantum algorithm. The feedback sessions with the teacher in-charge helped up to be in line with the project motive and gain valuable criticism and appreciation whenever necessary.

I also wanted to explore the courses in Astrophysics which motivated me to take the course Planetary Science that gave me a broad overview of the planetary studies, the underlying physics and technical details that goes into studying distant stars, their properties to exoplanets and geographical complexities of the habitable planets.

To remain in line with the ERASMUS vision to engage in sustainable studies, I enrolled to the course Climate Change: Science and Ethics as a part of which I was involved in an academic study of the climate change from the group up basics to the various scientific advances in the field. The course also gave me an opportunity to be a part of a graded team-project to assess a regional or global climate issue from an ethical standpoint involving constructive and critical arguments taught during the lecture sessions.

The course credits can be formally exchanged to KTH by making a formal application to the Exchange Studies Office. The administrative office was in touch with me with constant updates and information on the developments at the end of the semester to advice on the procedure.

City and country

The Netherlands is one of the most welcoming countries in Europe with most population speaking English which is necessary for an international student like me to engage with new people and make friends. The city of Hague where I lived is particularly international and hosts people from various backgrounds including that of bureaucrats owing to its diplomatic significance. I didn't not encounter any kind of cultural shock except in terms of the costly living expenses for a student like me.

Leisure and social activities

The Netherlands is a country with rich tradition and for a person like me who like to enjoy the local history, it's a place with great historical significance. I took advantage of some world-famous museums in Amsterdam by visiting them and taking trips to the city on some weekends whenever possible. The Hague in itself hosts, International Court of Justice and International Criminal Court within a majestic building at the centre of the old town and I had a worthwhile time visiting. I also attended a planar session of the Dutch parliament as it is open to public on all the days in session.

I registered myself to be a part of TU Delft Debate Club and could visit many other local universities taking part in debate contests. The club had a weekly debate session where we meet all the club members to debate and discuss some hot social and political topics or sometimes few fun topics as well. I should say, this exposure to British Parliamentary Debate culture has broadened my horizons and thoughtful thinking in many ways.

Other recommendations and observations

I have no tips but to say "Enjoy your time in Exchange engaging with local demography and maing new friends all without losing focus on studies"