



## Zürich: The silicon valley for Robotics!



### Before departure

First and foremost, I applied to exchange studies to try and experience the best universities out there apart from KTH, and ETH Zürich was a no-brainer. I chose ETH Zürich, since both the city and the university are well-known for their groundbreaking work in the field of Robotics. My other personal reason to go to Switzerland, was my friends. I had multiple friends studying at ETH, whom I've known from my undergraduate days in India, and some even from high school. My expectation was that the city would be expensive (which was completely true) but my experience were much more getting to meet new people and enjoy a new culture. The preparation was the longest and one of the hardest things I had to do before my departure, starting from December 2022 until August 2023.

1. Apply for the exchange. As a non-KTH undergraduate, only the first 2 or 4 courses of your Master's are considered towards the application for the exchange. In most cases, to be successful in getting chosen for ETH, you should have A in all your courses, while applying (not necessarily for KTH undergraduates). Getting a spot means that you were successful in getting nominated by KTH. This makes you eligible to apply to ETH (deadline on 1<sup>st</sup> of March usually). Then, you will have to apply through ETH mobility online and fill up a similar form and upload the necessary documents.

If you're successful you get the following mail from ETH.

Dear Student,

Your home university has just informed us that you have been nominated for an exchange period at ETH Zurich during the **Autumn semester 2023 – ETH Department of Information Technology and Electrical Engineering**. Congratulations!

2. No visa application needs to be filled since Sweden already provides a Schengen visa to non-EU students (and much easier for EU students), and it can be used to enter Switzerland.
3. I decided to apply for a German A1 language course at the [UZH Sprachenzentrum](#), the details will be provided to you by ETH once you're selected. It cost me 100CHF (around 1250 SEK) which I had to pay upfront, and was later reimbursed by KTH once I successfully passed the course.
4. Finding an apartment in Zürich is extremely difficult. Fortunately, exchange studies have a pool of rooms allotted to them by ETH. More information [here](#).
5. At KTH, you'll have to carefully select a study plan that satisfies your curriculum requirement, for a successful credit transfer later.

IMPORTANT: For aspiring TSCRM students, I would advice you to complete Theory and Methodology of Sciences (TAMOS) course in the second term (during either P3 or P4) before the exchange. Otherwise, you might have to do an extra semester before your thesis since TAMOS is a mandatory requirement to register for Master's thesis.

## Upon arrival

This [link](#) contains all the necessary steps before and after the arrival. My studies were scheduled to begin on the 19<sup>th</sup> of September, 2023. I arrived in Switzerland on 2<sup>nd</sup> of September, 2023 to attend the 10-day intensive German A1 language course that was scheduled to begin on the 4<sup>th</sup> of September. There were multiple social events for the exchange students to get to know each other, but I met other students mainly through the language course. I would very much suggest that you enroll, to find new students that also do exchange studies. There are multiple student unions and clubs, and there's also the well-acclaimed sports organization known as [ASVZ](#) (Akademische Sportverband Zürich).

As a newly arriving exchange student, you'll be given multiple possible dates to collect your documents, to apply for the Swiss residence permit (should be done within 14 days of entering Switzerland). The documents include:

1. [Student ID card](#) (also the access card for department buildings and ASVZ) and ETH mystudies login to get other documents.
2. Proof of Sufficient Financial means (for RP application).
3. Confirmation of Matriculation.
4. Extended Confirmation of Matriculation (for RP application)
5. SEMP/Erasmus Scholarship (depending on if you're Swedish or not).

Then, you'll have to get a [Swiss pass](#) card from SBB (Schweizerische Bundesbahnen) from Zürich Hauptbahnhof (Zürich HB). I ordered this on the same day as my arrival, and they initially give you a temporary Swisspass in paper, until the card is delivered to your registered address. This serves as identification for the travel within Switzerland. Your travel tickets are then added to your Swisspass account on SBB.



*Swiss pass card*

There are multiple types of tickets that SBB offers (but not limited to):

1. [Zone 110](#) pass (for travelling within the inner Zürich city, doesn't cover the Zürich airport). Costs 63CHF/month for youths under the age of 25, and it's 88CHF/month for those older.
2. [NightGA travel card](#) (for 100CHF). Youths under the age of 25 can travel anywhere in Switzerland from 7pm to 5am, and is valid for one-year from the time you get it.
3. [Half-fare travelcard](#) (for 120CHF). Reduced- or half-fares on 90% of the trips in Switzerland. Also worth it, if your exchange is for a year, or if it's during Spring semester, when people tend to go on a lot of hikes, or even for ski-season.

## Financials

Exchange semester: The scholarship money was offered from the side of ETH, in the form of SEMP (Swiss-European Mobility Programme). I received a total of 1900CHF (380/month) in cash initially, and I immediately applied for a UBS Swiss bank account on the first week to deposit that money.

Degree project abroad: I did my degree project also at ETH, right after my exchange semester. I received a travel grant from KTH for 6000CHF. As Switzerland is not from EU, students don't get the usual monthly Erasmus scholarship.

As a student in Switzerland, it's extremely important to either cook yourself or eat at **Mensa** (the university canteens in ETH and UZH). Every restaurant is expensive in Zürich, and students rarely eat outside. The one I very much preferred to eat was at *Zuri bistro*, since it was the cheapest option with really good doner. I cooked a lot on my own when I had free time during the semester. But during exams and deadlines, Mensa is a very good option to save time on cooking. It's also very cheap compared to the alternatives outside. A student meal at ETH costs 7 CHF for vegetarian, 8.5 for non-vegetarian, and 7.5 for vegan. It's slightly lower priced at the nearby UZH (University of Zürich) albeit with a lower quantity too.

The supermarkets in Switzerland are relatively much cheaper than eating outside. On average it costs around 50 CHF each week to buy groceries and necessary utilities if you cook regularly on your own. The traditional ethnic groceries from Indian, Chinese, Turkish, and other stores can cost additionally.



*Migros supermarket*



*Zuri sacks*

The recycling also works different in Switzerland. They incentivize you to recycle the waste. They provide bags called the **Zurisack** (comes in different sizes and can be purchased at Supermarkets), and any kind of waste can go into this, but you pay to purchase these bags (1.8 CHF for a 35litre bag). On the other hand, recycling the waste (paper, PET bottles, clear glass, cardboard, oil, tin-cans, etc) is free, and there are multiple stations where you can do so. This could be a culture shock to people from other countries.

It's also mandatory to apply for Swiss health insurance if you don't have the European health insurance or a valid coverage from KTH. In my case, as a tuition fee paying student I had a valid health coverage from [Kammarkollegiet](#) (Swedish state health insurance) offered through KTH. This coverage includes a document for students going abroad for exchange, and it is given to you on request, from the International exchange coordinator. Once I had my insurance, I had to apply for an exemption from the mandatory Swiss insurance (KVG) with the city of Zürich (more information in this [link](#)), and this takes at least 5-6 months to process, and you'll mostly return back to KTH before that decision.

## Accommodation

Finding an apartment in Zürich is extremely difficult, especially having never been there. Fortunately, I had two offers for accommodation. The first one was by applying to the exchange office of ETH Zürich (these student rooms are offered to new exchange students alone) at a rent of 680CHF. The application for this accommodation is around the time of June (before the exchange) and it fills up really quick, so try to apply as soon as possible. The other one was also facilitated by ETH, where they connected exchange students going to and from KTH and ETH. I met a student from ETH Zürich who was planning to move to Stockholm for exchange studies at KTH, and we each exchanged our student rooms, and thus it was really easy for me find a cheaper apartment in Zürich for 600 CHF.

My accommodation was a residential apartment with 2 rooms and a living room (so technically 3 rooms shared among students), a common kitchen and a bathroom. In general, the exchange student accommodation has a single room with a common bathroom shared by 4-5 students, and a large common kitchen shared by 120 students, at least the one at *Meierwiesenstrasse 62* (the common housing for exchange students). The kitchen can definitely get crowded at times, but on the other hand, the accommodation is very lively with a lot of student parties.



## University and studies

The university has two main campuses: ETH HG (Hauptgebäude: Main building) and ETH Hönggerberg, and the departments are spread around multiple parts of Zürich. The university is big, and offers a lot of programmes in Engineering and applied sciences: Computer Science, Electrical, Mechanical, Civil, Chemical, Physics, Chemistry, Mathematics, Architecture, etc. The courses are graded on a scale of 0-6 (4 for pass, and 6 for best grade, with increments of 0.25).



*ETH Hauptgebäude*



*ETH Hönggerberg*

The university studies run in the form of semesters for 3.5 months. Autumn semester runs from mid-September to the end of December with a three-week break, before the start of the exams from the final week of January to the 2<sup>nd</sup> week of February. The Spring semester starts immediately after the exams and goes on till the end of May with easter break in the middle. June and July cover the summer vacations and the spring exam period is from the 2<sup>nd</sup> week of August to the end of the month.

My exchange studies were completely in English, with the D-ITET (Information technology and electrical engineering) department, and my degree project abroad was with D-MAVT (Mechanical and Process Engineering). A regular day consisted of multiple 2 hour lectures/exercises/tutorials, and the general class hours for students are from 8 am to 5pm.

As a non-EU KTH student, it was mandatory for me to choose courses for 30 ECTS, but at ETH it's generally advised to pick courses for around 24 ECTS due to the difficulty. Some of the courses have very high workload even though they have less number of credits. The German language course I enrolled in, was an intensive course that happened before the start of the semester, but there are similar language courses that happen during the semester.



*German language course - Group hangout*

## Courses

I had to choose my courses very carefully to ensure that I satisfy all the requirements from the KTH curriculum. I was assigned to D-ITET at ETH due to the affiliation of TSCRM with EECS at KTH. Unfortunately, D-ITET did not have many relevant courses in my field of Robotics and Computer vision compared to D-MAVT and D-INFK. Thus, I decided to pick the following courses:

1. 900-0010-00L : 10-credit project (10 ECTS)

The semester project was on *Visual Inertial Leg Odometry* in the area of Computer vision and Robotics at the Centre for Project-based learning Lab. It allowed me to gain a lot of experience and expertise in ROS and Docker applications, and in the area of running real-time algorithms on quadruped legged robots (Unitree A1 and Go1). This was a completely independent research project on a pre-defined topic of the supervisor's choice, with clearly defined requirements for the grading.



*Unitree Go1 quadruped robot*

2. 151-0632-00L : Vision Algorithms in Mobile Robotics (offered by UZH, 6 ECTS)

Introductory course on Computer vision concepts and applications and an extremely good lecturer in Prof. Davide Scaramuzza (one of the pioneers in drone racing). We had a mini-project that could potentially provide 0.25/0.5 increments in the grade, with a single final exam graded out of 6.

3. 227-0225-00L : Linear Systems Theory (6 ECTS)

Mostly discusses concepts of Linear Algebra, Field theory, and basics of Control theory for linear systems. Had a mid-term for 30% and a final exam for 70% of the grade.

4. 263-5210-00L : Probabilistic Artificial Intelligence (8 ECTS)

Gives an advanced high-level introduction to Machine Learning concepts, Gaussian processes, Active Learning, and advanced Reinforcement Learning concepts. Had 4 projects with individual grades accounting for 30% of the grade, with a final exam accounting for the rest.

ETH has a strict policy that  $\frac{2}{3}$ <sup>rd</sup> of your credits should be taken from your department of enrollment (in my case it was D-ITET). But in rare cases, since D-ITET did not have many courses to offer in my field of interest, I requested for an exemption in the requirement from 20/30 credits to 16/30 credits. The semester project (1.) and the Linear Systems Theory course (3.) were taken from the department to satisfy the requirements and the other courses were electives.

## City and country

The country is extremely beautiful with a lot of picturesque landscapes, the mighty alps and an extremely well-maintained public transport. The trams, buses, trains are always on time, sometimes even early and very rarely late (I have personally had only 3 instances of public transport being late, during my 1 year of stay).

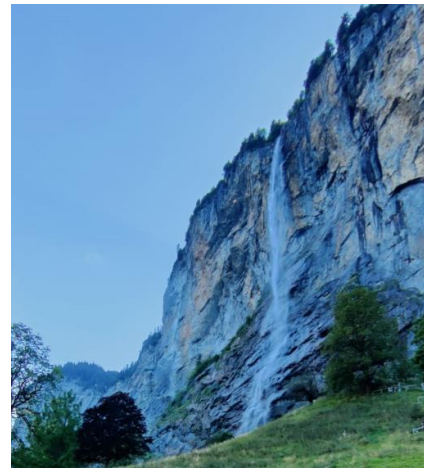
Zürich HB is the one of the busiest train stations in Europe, and the city has a lot of students and working population in the whole of Switzerland. So, it has people from different ethnicities and cultures. Since, I had already been in Stockholm, I did not have much of a culture shock in the perception of the country and the city. But the fact that the supermarkets are completely closed on Sundays, except for the ones at the train stations (open for travellers and other emergencies), was a shock to me and I had to travel all the way to Zürich HB on Sunday to buy utilities. Rest considered, the culture is very similar to Scandinavia, in the sense that it's very easy to make friends as a student than a working adult. There were multiple opportunities to find new friends: from student unions, exchange meetups, ESN Zürich and sports. Finally, the country has a lot of well-maintained open water fountains with clean drinking water, so do not worry if you're thirsty in Switzerland, there's always a fountain closer to you.



*Water Fountains*



*Interlaken*



*Lauterbrunnen*

There are quite a lot of beautiful tourist places to visit in Switzerland. Interlaken, Lauterbrunnen, Jungfrau, Luzerne, Zermatt (the place with Matterhorn) are one of the most well-known places to go for tourists. Do not forget to have **fondue cheese** while in Luzerne, especially during the colder Autumn semester. Finally, *Montreaux Christmas market* in the French part of Switzerland, was one of the best things to look forward to, along with the fresh snow-filled skiing on the Alps.

## Leisure and social activities

I mostly played Badminton in my leisure. **ASVZ** is a wonderful sports organization that offers numerous sports with lots of training sessions every week. And all that for absolutely 0 CHF. I used to play there 2-3 times every week (sometimes more), and it was my primary avenue of meeting new friends with whom I'm still in good contact. I very much suggest you to experience ASVZ as much as possible if you remotely love sports, or looking to learn a new one. In the rest of my spare time, I used to hangout and watch movies/cook with my close friends.





*Badminton at ASVZ*

I went hiking frequently during the start of Autumn semester, and always had a beautiful view awaiting me, at the end of every hike. So, the steps taken and the elevation gained were worth it, just for the new display pictures with the beautiful mountains and the clear blue lakes in between. Switzerland maintains their hike trails quite well, and there are a lot of them around the country. I used the **AllTrails** app to plan all my hikes.



*Hike Trails*



*Beautiful summit*

## **Final Remarks**

I would like to thank Ms. Christina Gabriellson and Ms. Manja Schubert (the International Exchange Coordinators for EECS) very much for facilitating this exchange, and also for always being responsive during my exchange regarding any queries I had.

They are very helpful and do not hesitate to contact them regarding any information! Also feel free to contact me at [deepakganesh1137@gmail.com](mailto:deepakganesh1137@gmail.com) for any questions regarding my exchange!