## *Course Report WASP Graduate School*

Date: 2025-02-24
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**Autonomous Systems, 6hp**
Semester: Fall 2024

Number of registered students: 54
Answering frequency (course evaluation): 28/54 (52%)

## Examination results

Number of students examined: 54 (students that did something at all)
Fail: 6 (11%) (not yet passed as of 2025-02-24)
Pass: 48 (89%)

## Brief summary of student viewpoints and suggestions

### Results of WASP base-line quantitative questions

- What is your overall rating of the course (1-5): 4.11
- Did you enjoy the course? (1-5): 4.29
- Was it time well spent? (1-5): 3.89
- *Did the course give a good overview of Autonomous Systems: 4.39*
- *Was it easy to understand the course material: 4.43*

### Answers to free text-questions to be (shortly) summarized under "Strengths" and "Weaknesses"

- What was the best aspect of the course?
- What would you suggest improving?
- What advice would you like to give to future participants?
- Other comments. Is there anything else you would like to add?

### "Strengths" according to students[2]

- The majority thought that the course was at a suitable level or a bit too easy and only one answered that it was "way too easy" which is a good sign for an introductory course.
- "hands-on experience of many different aspects of autonomous systems"
- "well structured"

[1] *The report should be written by the examiner together with the teachers and possibly others, such as teaching assistants*
[2] *Based on both quantitative results and key viewpoints from students' free-text answers*

- “getting to know ROS was a plus”

**"Weaknesses" according to students**[2]

- A few said that it was too simple but that is both a weakness and a strength. It should be too simple for those that have a background in the subject.
- Trouble with using the external SSD that we provided on some laptops. The alternative to not provide an SSD would instead have caused problem for almost all students if using Linux is kept as a desired experience.
- Not being able to use the SSD on a Mac.

## Comments from teachers on the implementation and outcome of the course[3]

- We did not make any major changes this year. This resulted in a well-structured and “well-oiled machinery” with good predictability for the students so that the work could be planned.

## Proposed changes/comments/measures

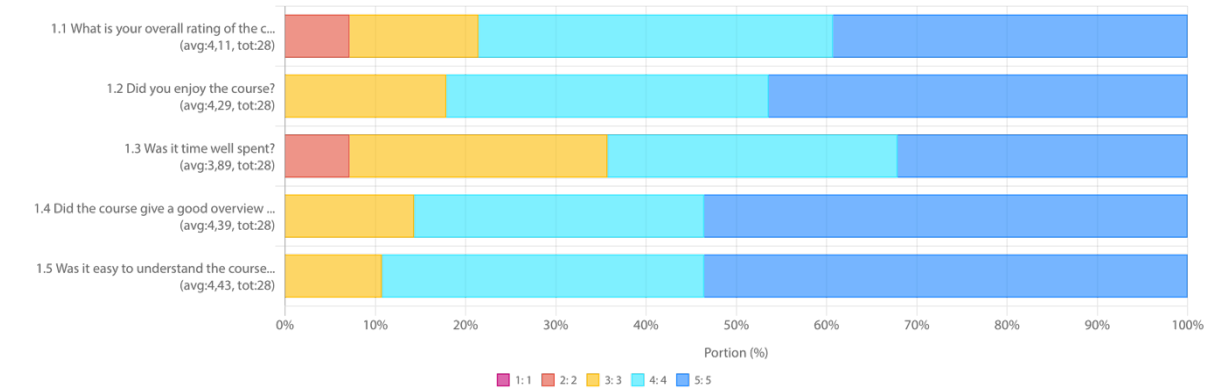
- Finding some way to cater for students with a Mac would be a big plus. This year with made a quick test with using VirtualBox as this would run on any hardware but it was not good enough for the assignments that require heavier graphics and/or a physics engine. We will investigate a dedicated and high-performing Mac only virtual machine solution and SSD for the rest.

[3] *Including changes effected during the course*

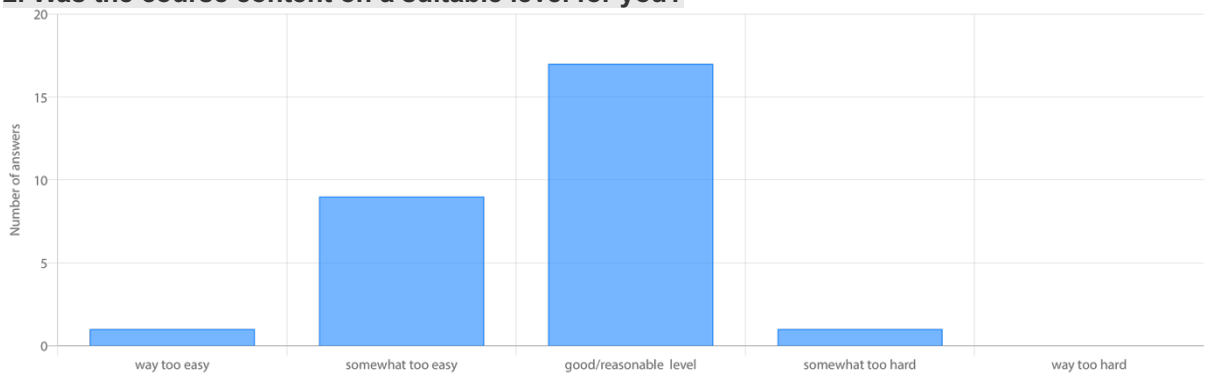
# Report "Evaluation survey AS 2024"

Number of answers: 28 items

### 1. On a scale of 1-5 (5 being the highest) rate your experience of the course based on the questions below.




### 2. Was the course content on a suitable level for you?




### 3. What was the best aspect of the course?

**All answers**

That many different concepts were introduced and that we got a hands-on experience of many different aspects of autonomous systems

It didn't take a lot of my time.

Compared to other WASP courses there was a stronger focus on understanding concepts rather than just socializing.

I appriciated the well structured formath

It was well organized and well balanced.

Assignments are well designed. It is fairly easy to use the SSD to get the environments we need.

Good networking with other students. Nice organization by the responsible people for the course.

The assignments were interesting but not very challenging. Getting to know ROS was a plus.

Jana’s presentation

I liked the hands-on approach, especially in the first module. In many other courses, extensive lectures about some just too specific topics are given instead of a decent introduction to the subject. In this course, it was clear what we were talking about from the start.

The course was well structured and gave the student flexibility to learn more or less about various subjects by providing lots of additional information and links on topics as well as some optional modules to choose from.

Very well-organized. Good instructions of labs, possible to do at own pace, and availability of teachers (both Zoom and Slack/Canvas).

Nice overview of main concepts.

The practical assignments

Hands-on approach, projects with skeleton code

Seeing both theory and then in practice application in the homeworks.

Let me gain basic understanding on Autonomous systems.

The assignments were quite good; having an elective assignment was great.

Assignments were well structured with clear guidelines on which callback function has to be populated for a specific question. This allowed greater attention to be put into understanding how to implement a concept instead of getting stuck with ROS specific problems.

The assignments are well designed and the instructions are easy to follow even if I don't have any knowledge of autonomous systems prior to this course.

I liked the videos for the assignment, they made me understand how to solve the assignments. Also the meeting in Stockholm was fun.

The SSD is well-prepared and saves tons of time to set up the environment.

different domain knowledge

The exercises were fun and made me want to learn more about the topic.

The professors show complete understanding of the topics they are covering. I come from a completely different field but the material was clear to understand, its clear they have spent a lot of time in preparing this course.

It gave a good overview of the area. I liked the idea of having many small assignments.

The in person labs

Assignments in ROS were not overly complicated (I.e., it was not a course on how to program in ROS). In particular, they were useful to understand the subject even more.

**4. What would you suggest to improve?**

**All answers**

minor: some of the frameworks are quite bulky. ROS and matlab are huge programs to be installed. I understand the point of them, but I did find some of them quite cumbersome, especially since this is a breadth-course for me

I am not sure.

The course was a bit too easy. The SSD setup didn't work initially for LiU laptops

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Nothing. It is difficult to meet every course participant's expectations.

I learned only from assignments, i.e. look up and learn what I need in the assignments. It could be better to have some recorded lectures to gain some knowledge in advance.

Make the assignments and lectures more technical so that we as students can learn more.

Increase the difficulty level of the course.

The control part could be a bit more difficult

I would have liked to be encouraged more to look into how ROS actually works. The tasks in the assignments didn't really help gain insight into this, which makes it very much dependent on our own motivation to delve further.

The teachers all have incredible knowledge in their respective fields. I think the sparse in person meetings could take better advantage of this by deep diving some of their favorite topics to bring student up to the state of the art in some of their subjects.

Make the make-up assignments not relying on other students (extra burden for those who already spent the time going to the meetups). Lose-lose when "bouncing" the requests to help.

Nothing as such but it might be nice if things work on Mac as well.

The planning and control parts are a bit too easy

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Fun and interesting course overall. The four course parts seemed a bit disconnected. If the course is to be an introduction to systems in general then maybe it's unavoidable but it would be nice if there was some sort of cohesion.

The teachers/professors seemly spend too much time on the basic assignments.

Generally, the course was quite easy (for someone who doesn't work with AS). 1) Adding an elective assignment for pathfinding. 2) Discussing actual content during the meet-ups. The lecture of the first session was mostly marketing material on AS. I would've liked more content. The group work in both sessions was great. 3) The compensation part of the PID assignment could be integrated as part of the main assignment. I liked it quite a bit.

Paper readings: students could be split up into groups and each group gets a paper to go through and prepare a summary of in 45 minutes or so that will be presented to the rest of the class.

The assignments can be harder.

To be able to run everything on a mac...

zoom meeting for helping on the assignment is good but using Slack could be visible to more participants.

reduce the workload of assignment

Maybe a few more hints on conditional assignment A and B. The second meeting had a professor tell us about what seemed like a really cool lab at KTH, it would have been fun if we could have gone there as well.

Nothing, its just the best course among all the WASP courses I have taken. The professors plan the work we must do every week, they have designed the course very meticulously.

Getting the SSD to work on uni computers was horrible. Finding a way that works for everyone is difficult, but this struggle took a lot of time to solve.

nothing

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**5. What advice would you like to give to future participants?**

**All answers**

take it, lean into it, enjoy it! it's a fun course. do the work, do it early so that you have time to be inspired and explore

Do the assignments in time, so they don't pile up.

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The time consumption is approximated beforhand, use that to plan

Start well in time with the hand ins.

Double check the assignment requirements. You have to complete at least one elective assignment.

Have a linux computer ready that you can boot from an external SSD.

If you've already taken basic courses in control, vision e.t.c. this might not be for you.

Try to get a spare computer with fresh Ubuntu

Take this course, you will learn a lot and maybe even have fun.

Finish the first assignment as soon as possible to get over any learning curve about computer setup and how the course modules feel.

Plan ahead, do a best-effort to solve labs before the Q&A session (to make sure you have an opportunity to ask questions), and use the time to look at and read all linked resources to catch up with some knowledge (you have the time!). Also, it's really beneficial to have a get-together/study-group with local students so you can discuss the assignments, help each other when you get stuck etc. and you will learn even more/better this way as well as finishing more timely and efficiently.

Attend all meetings since it’s a good networking event.

Do the assignments carefully

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It's a nice introductory course and it should be taken early on in one's PhD program.

The teachers/professors should spend more time on the conditional elective tasks instead of making it too strict on marking the basic ones.

None, really.

Spend the extra time on the project submissions to get the most out of this course

None

Plan your work and do not leave the assignments until last minute. It was nice to be done on time.

Good introduction course, it will not be too deep in all the topics.

be skilled at Linux and Cmake/Make

The course is a lot of fun so enjoy it.

To enjoy the course, most WASP courses are very boring or badly designed, this was not the case. I did learn a lot and was amazed at the new technologies.

Get working on the assignments as soon as possible. Looks harder than they are.

During the first in-person meeting, for the competition when you are supposed to measure distance using inertial sensors, it's better to cheat than to make an honest attempt. All those who won were actually disqualified, but still got the prize (candy).

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**6. Other comments. Is there anything else you would like to add?**

**All answers**

no

no

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Thank you for a well organised course

No.

I appreciate and respect the efforts to prepare all these SSDs.

Nice lunch and dinners but the actual technical stuff in the course could be improved. Maybe fewer assignments but more detailed or some kind of project work to increase what we can learn from taking the course.

The idea of having extra assignments is good but there is really no incentive to do more than one. Maybe incorporate some parts of those into the mandatory assignments?

Thanks for the course

Thanks!

I think it would be awesome to have a follow on applied autonomous systems course. Maybe this could be a summer or winter school. It would be great to use this intro course as a ramp up for some annual robotics competition that WASP could maintain a presence in. If there is no good current challenge going on, maybe WASP could host its own internal DARPA like challenge to work on developing state of the art autonomous systems. There is probably an opportunity to do this in cooperation with WARA-PS, since they have a natural desire to see applied autonomous systems performing useful missions in the outdoor environment.

Really enjoy the effort you've put into this course. It's really noticeable! Thanks!

Nothing much

None

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Instructors were very helpful, including with technical problems many faced. There was some discussion about changing the technical implementation of the course in the future (e g. Using docker images or remote vms) however, it is my view that this would be excessive and not necessarily a good use of student's time. I would not like to spend more time than necessary trying to get a docker image to work, let alone learn from scratch some other software. This year's external hd solution had some quirks, but they seemed to be easily solvable (and it's more intuitive for everyone i believe).

no

n/a

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None

To get hold of a non-mac laptop was not easy and something that could be communicated earlier that you need and what you should do if you can't find one. Overall, I enjoyed the course!

NO

no

The professors were really nice and fun. They all did an amazing job.

Its just the best course in WASP, many professors should learn from this one. Its well designed, the professors do give the extra mile. What I like the most is that the professors have a working plan every week. On the other hand, other WASP courses are poorly designed and have zero activities per week and then a super heavy impossible project at the end of the semester when we are already saturated of teaching and many other activities.

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These courses are good networking opportunities, and could replace the "networking" summer school.That would be more productive.

No need for zoom meetings in my opinion.

# Student feedback on WASP Autonomous Systems course fall 2024

Date: 2025-02-24
Meeting over Zoom
Participants: Patric (examiner) and two student representatives (Maja and Yde)

We went through the survey results and concluded that students liked the course overall.

Suggested changes

- Make-up assignments could be improved by simplifying finding people. One suggestion is to create a group with people that missed a meeting and then let them do the make-up routines together. Both the network and the group work.
- Prioritize getting something that works on a Mac and no matter what, send out information about computer requirements much earlier so that students can prepare.
- Add a conditionally elective task that lets a student define their own project to dive into a topic of their choice a bit more. Setup: Write a proposal, get it approved and then do work. This allows them to align it with what you have to learn for your research.