

Technical Basics II

WiSe 2025/26

Room: Hamburg Media School 139

GitHub: <https://github.com/cqx931/techBasics2>

LECTURER

Qianxun Chen

Email: qianxun.chen@leuphana.de

Office Hours: By appointment

COURSE DESCRIPTION

In this class, we'll take the leap from software programming to physical computing. We will learn about the fundamentals of electronics, such as resistors, capacitors, potentiometers, and LEDs, and learn how to control them using a microcontroller— the Arduino. You'll gain hands-on experience reading and interpreting schematics, prototyping circuits, and soldering components. While the focus is on hardware, there will still be some programming as well, but this time in C++. By the end of the class, you will have enough basic knowledge to research further the topic of electronics based on individual interests.

CALENDAR

Every Tuesday

9:45-13:15 - Stream A

14:00-17:30 - Stream B

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| 14 Oct | Week 1: Introduction and blinking LED on Arduino |
| 21 Oct | Week 2: Breadboard and schematics with basic components |
| 28 Oct | Week 3: Pins: analog/digital inputs and outputs |
| 4 Nov | Week 4: Passive/active buzzers and audio, multimeter |
| 11 Nov | Week 5: DC motors, diodes and push buttons |
| 18 Nov | Week 6: Servo motors and stepper motors, library |
| 25 Nov | Week 7: Transistors, MOSFETs and relays |
| 2 Dec | Week 8: Inspirations for project ideas Soldering basics |
| 9 Dec | Week 9: Initial project idea presentation A Perf board Prototyping |
| 16 Dec | Week 10: Initial project idea presentation B Communication protocols |
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--- Christmas and New Year's Break --- | |
| 6 Jan | Week 11: Arduino + Python Project Development |
| 13 Jan | Week 12: Display Technology Project Development |
| 20 Jan | Week 13: ICs and reading data sheets Project Development |
| 27 Jan | Week 14: Project Presentations with prototype |

GRADING

Participation:	10%
Learning Log:	20%
Project Presentation:	20%
Final Project Submission:	50%

Participation

Your active engagement in class: arriving on time, actively listening, following instructions, asking and answering questions, and supporting your peers. There will be mainly in-class exercises for this class and your participation is very important.

Learning Log

Due to the nature of electronics and the size of the class, it is challenging for me to review your processes individually. This time, we won't have any assignments, but a simple learning log for you to document your learning process throughout the semester. Please try to make an entry each week, and it doesn't need to be long. You can mention what you have learnt and what your main struggle was in completing an exercise. Photos can also be attached, but it is not a must.

Final Project

The final project of the class can be anything you want to build, making use of what you have learnt about electronics and Arduino during the semester. It can be an automated plant watering system, a fancy LED Cube, an interactive art project, or a music instrument made by circuit-bending a toy. You are encouraged to pick a topic that interests you and develop a feasible project idea around it, combining what you learnt from the class **with further research and self-directed learning**. You could also incorporate it with your knowledge from Tech Basics I.

The final Project can be done individually or **in groups with a maximum of three people**. Start thinking about what you want to make in the second half of the class. If you wish to purchase a particular component for your project, leave enough time for ordering, cause it can take some time for things to arrive. Feel free to contact me if you are uncertain about your idea.

The Final Project is due at 15. March Midnight

The project will be evaluated in two parts:

1. Intermediate Presentation 20%

In the last session of the class, you will give a short presentation about your final project. It shall include a project abstract, some initial research or experiments you have done, libraries that you need, potential references, and task distribution in the case of a group project.

2. A GitHub repository with your files and documentation 50%

You shall upload all the files for the final project to a GitHub repository.

- a) A short project description text in the README file
- b) A demo video showing the project functioning
- c) Arduino Code
- d) Process Documentation

COMMUNICATION

I will be communicating with the class through MyStudy's email list. This means that you should be reachable by email. Please make sure to regularly check your email!

You can always reach me directly by email if you have questions or can't make it to the class. If you would like to talk in person, please send me an email first and we can make an appointment.

The **Digital Media Lab** on the Leuphana campus (Building 5, Room 122) opens every **Wednesday from 10:00 a.m. to 6:00 p.m.** There will be a station with extra components and equipment for working with electronics if you don't have particular tools at home.

The lab managers can also be reached by email if you have any questions:

Cil: Cil-Vivien.Klein@stud.leuphana.de

Arsen: arsen.Aloian@stud.leuphana.de

TECHNOLOGY POLICY

Laptops will be an essential part of the course and may be used in class for taking notes in lectures and following instructions in exercise sessions. Out of respect for the class and your fellow students, please refrain from using social media and messaging applications during class time. Phone use in class is strictly prohibited unless directly related to a presentation of your own work or if you are asked to do so as part of the curriculum.

AI POLICY

See [AI Agreement](#)

REFERENCES

Arduino Official Tutorials

<https://www.arduino.cc/en/Tutorial/HomePage/>

Arduino Youtube video tutorials by Paul Mcwhorter

<https://toptechboy.com/arduino-lessons/>

Instructables

<https://www.instructables.com/>

Starhardware (In German)

<https://starhardware.org/>