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Introduction to the Master´s Program Electrical Systems Engineering

Today: Talk given by Vijayalakshmi and Harshan
on behalf of ***Prof. Dr. Christoph Scheytt***
Head of ESE Program

8. October 2025

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Outline

- **Elements of the Master´s Program**
  - Lectures & Exercises
  - Seminar
  - Project Group
  - Master´s Thesis
  - General Studies

- **Structure of the Master´s Program**
  - Specializations
  - Modules

- **Examinations**

- **Good to Know**

Elements of the Master´s Program

Lectures & Exercises *(Vorlesung mit Übung)*

- 2 hours lectures and 2 hours exercises per week (V2+Ü2)

- Lectures
  - All students meet
  - Teacher talks

- Exercises
  - Students meet in 1 large group or subgroups
  - Tutor moderates discussion with students
  - Students might present or submit prepared homework

Elements of the Master´s Program

Seminar *(Seminar)*

- 2 meeting hours per week (S2)
- Teacher proposes topics
- Every student
  - selects one topic to work on,
  - prepares a talk with slides *(Seminarvortrag)* and
  - submits a written elaboration *(Ausarbeitung).*

Elements of the Master´s Program

Project Group ***(Projektgruppe)***

- Two PG for half a year (or one PG for an entire year)
- Total workload per half-year PG: 1.5 days per week for 6 months
- Students
  - apply for a PG and
  - Work on a project as a team (in general: analysis, design, realization and test of a system)
- PG provide practical training in engineering tasks
  (can be good preparation for master thesis)

Elements of the Master´s Program

Master´s Thesis ***(Masterarbeit)***

- Workload: Full-time for a half a year

- What has to be done?
  - Literature review
  - Research
  - Often: Implementation of some software or hardware
  - Writing a thesis (~50-80 pages) on scientific level
  - All this: within 6 month (formally checked!)

- Two steps:
  - First: **Planning phase** (typically 1 month)
  - Second: **Execution phase** (5 month)

Elements of the Master´s Program

General Studies *(Studium Generale)*

- **Any topic from the lecture catalogue with CP**

- **Example: German language course** *(Deutschkurs)*
  - Hosted by the International Office *(Akademisches Auslandsamt)*
  - Strongly advised (a big asset for your future career!)
  - May cover the “General Studies” module
  - 1 month crash course (5 CP); Semester afternoon course (8 CP)
  - Free of charge!
  - Information: https://www.uni-paderborn.de/en/zfs/language-courses-for-students/german

Structure of the Master´s Program

Two Specialization Tracks

- Signal & Information Processing (S&IP)
- Electronics & Devices (E&D)

Every student selects one of the two.

Practical note: If not pre-selected in you PAUL account, select your specialization as the first thing you do in PAUL do avoid future problems when selecting courses.

Structure of the Master´s Program

MASTER OF SCIENCE
ELECTRICAL SYSTEMS ENGINEERING – SIGNAL & INFORMATION PROCESSING V3

Semester							
	1	Advanced System Theory (6 LP)	Modeling and Simulation (6 LP)	Statistical Signal Processing (6 LP)	Compulsory Elective Fundamentals of ESE (6 LP)	Management of Technical Projects (3 LP)	General Studies (3 LP)
	2	Statistical and Machine Learning (9 LP)	Compulsory Elective S&I Processing (6 LP)			Project (1 x 18 LP or 2 x 9 LP)	General Studies (6 LP)
	3	Compulsory Elective S&I Processing (6 LP)	Elective ESE (6 LP)	Elective ESE (6 LP)			Topics in Systems Engineering (3 LP)
	4	Master Thesis (30 LP)					

- Electrical Systems Engineering
- Introduction to ESE
- Fundamentals of ESE
- Signal & Information Processing (S&I)
- Introduction to S&I
- Management and Application
- Projects
- General Studies

Structure of the Master´s Program

MASTER OF SCIENCE
ELECTRICAL SYSTEMS ENGINEERING – ELECTRONICS & DEVICES V3

Semester							
	1	Advanced System Theory (6 LP)	Modeling and Simulation (6 LP)	Analysis and Design of Electronic Circuits (6 LP)	Compulsory Elective Fundamentals of ESE (6 LP)	Management of Technical Projects (3 LP)	General Studies (3 LP)
	2	Electromagnetic Waves and Waveguides (9 LP)	Compulsory Elective Electronics & Devices (6 LP)			Project (1 x 18 LP or 2 x 9 LP)	General Studies (6 LP)
	3	Compulsory Elective Electronics & Devices (6 LP)	Elective ESE (6 LP)	Elective ESE (6 LP)			Topics in Systems Engineering (3 LP)
	4	Master Thesis (30 LP)					

- Electrical Systems Engineering
- Introduction to ESE
- Fundamentals of ESE
- Electronics & Devices (E&D)
- Introduction to E&D
- Management and Application
- Projects
- General Studies

Structure of the Master´s Program

Compulsory Modules *(Pflichtmodule)*

- **Introduction to Electrical Systems Engineering** (12 CP)
  - Advanced System Theory
  - Modeling & Simulation

- **Management and Application** (6 CP)
  - Management of Technical Projects
  - Seminar Topics in Systems Engineering

Structure of the Master´s Program

Compulsory Optional Modules *(Wahlpflichtmodule)*

- **Introduction to S&IP**
  - Statistical & Machine Learning (9 CP)
  - Statistical Signal Processing (6 CP)

or

- **Introduction to E&D**
  - Electromagnetic Waves and Waveguides (9 CP)
  - Analysis and Design of Electronic Circuits (6 CP)

(According to the specialization chosen) (15 CP)

Structure of the Master´s Program

Elective Modules *(Wahlmodule)*

- **Fundamentals of Electrical Systems Engineering** (6 CP)
  - Advanced Control
  - Data-Driven Engineering
  - Data-Driven Innovation
  - Model-Based Systems Engineering
  - Digital Speech Signal Processing
  - High-Frequency Engineering
  - Introduction to Algorithms
  - Optimization-Based Control Methods

  (One subject from a catalogue of further basic subjects)

- **Compulsory Elective S&IP** or **Compulsory Elective E&D** (12 CP)

  (Two subjects from a catalogue for the chosen specialization)

Structure of the Master´s Program

Example: S&IP

Studying this module means: taking at least **two** of these courses!

The Following courses are offered at the moment:

- Advanced Control
- Advanced Topics In Robotics
- Algorithms and Tools for Test and Diagnosis of Systems on a Chip
- Cognitive Systems Engineering
- Digital Image Processing I & II
- Nonlinear control of autonomous and robotic systems
- Numerical Simulations with the Discontinuous Galerkin Time Domain Method
- Optical Waveguide Theory
- Optimal and Adaptive Filters
- Optimization-Based Control Methods
- Reinforcement Learning
- Robotics
- Theory and Design of Phase-locked Loops
- Topics in Advanced Control
- Topics in Pattern Recognition and Machine Learning
- Topics in Signal Processing
- Wireless Communications

Structure of the Master´s Program

Example: E&D

Studying this module means: taking at least **two** of these courses!

The Following courses are offered at the moment:

- Advanced VLSI Design
- Advanced Quantum Optics
- Analog CMOS ICs
- Controlled AC Drives
- Design of Energy Transition Scenarios
- Energy Transition
- Fast Integrated Circuits for Wireline Communications
- Fundamentals of Optics
- High-Frequency Electronics
- Integrated Circuits for Wireless Communications
- Nonlinear control of autonomous and robotic systems
- Numerical Simulations with the Discontinuous Galerkin Time Domain Method
- Optical Communication A/B/C/D
- Optoelectronics
- Power Electronics
- Radio Frequency Power Amplifiers
- Solar Electric Energy Systems
- Theory and Design of Phase-locked Loops
- VLSI Testing

Structure of the Master´s Program

Further Elective Modules *(Module)*

- **Electrical Systems Engineering** (12 CP)
  (two subjects from all the classes offered in the field of Electrical Systems Engineering, provided that they are not credited to other modules)

- **General Studies** (9 CP)

- **Project groups**
  (18 CP: one full-year or two half-year projects)

- **Master´s thesis** (30 CP)

Structure of the Master´s Program

Module Manual *(Modulhandbuch)*

Available online as PDF at: go.upb.de/studi.et_regulations

Module handbooks

	Winter semester 25/26	Summer semester 25	Winter semester 24/25	SoS2 24
ESEMA v1				
ESEMA v2	Preamble + MHB	Preamble + MHB	Preamble + MHB	Preamble + MHB
ESEMA v3	Preamble + MHB	Preamble + MHB	Preamble + MHB	

Older module handbooks and preambles can be found in the archive .

Examinations

- **Modules**
  - In general: One oral examinations
  - In some cases: Written examinations
- **Project Group**
  - Permanent evaluation throughout the project
- **Master´s Thesis**

Examinations

Repetitions

- Oral and written examinations can be repeated **twice.**
- The Master´s Thesis can be repeated **once.**
- Project group can be repeated twice
  (You will not want to do that!)
- German language course can be repeated infinitely.

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Examinations

Examination Regulations *(Prüfungsordnung)*

Available online as PDF at: go.upb.de/studi.et_regulations

Current examination regulations

Master's program in Electrical Systems Engineering

	General provisions	Special provisions	Amendment to the statutes	Reading version
Electrical Systems Engineering Master v3 (enrollment from winter semester 2024/25)	AM 32.24 (Reading Version)	AM 35.24 (Reading Version)	AM 55.24	Reading Version

Examination Board

What are its tasks?

- Organizing and supervising examinations:
- ensuring compliance with the examination regulations and observance of the rules of procedure adopted for conducting examinations;
- decisions on objections to decisions taken in examination procedures;
- drawing up an annual report to the Faculty Council on the progress of the examinations and the duration of study;
- additional tasks expressly assigned to the Examination Board under these Regulations.

[Examinations Regulations Sect. 1 (1)]

Examination Board contd.

What are its tasks? contd.

In addition, the Examination Board makes suggestions about the reform of the examination regulations and the study regulations and discloses the distribution of marks.

Examinations Regulations Sect. 1 (1)

Examination Board contd.

Professors	
Member	**Substitute**
Prof. Sybille Hellebrand (head)	Prof. Erdal Kayacan
Prof. Jens Förstner	Prof. Dr. Reinhold Häb-Umbach
Prof. Christoph Scheytt	
Academic Staff	
Markus Hennig	Dimitrij Drejling
Student Members	
Matthias Johannes Geilhorn	Daniel Figge (Deputy)

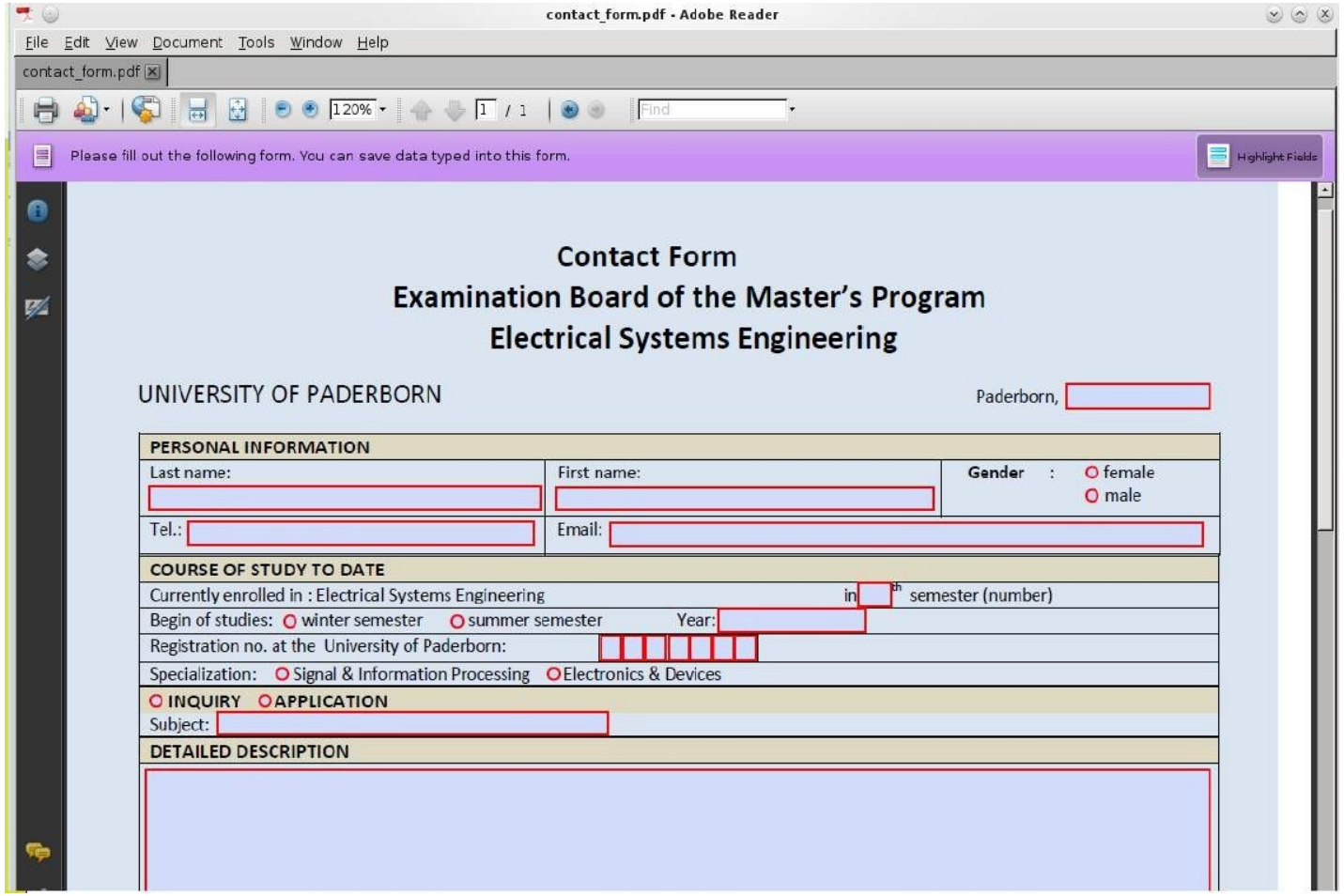
Examination Board contd.

How to file a request?

Use the contact form and add your current Transcript of records.

You can find it at: go.upb.de/ese_contact_form

Good to Know...



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4. **Good to Know**

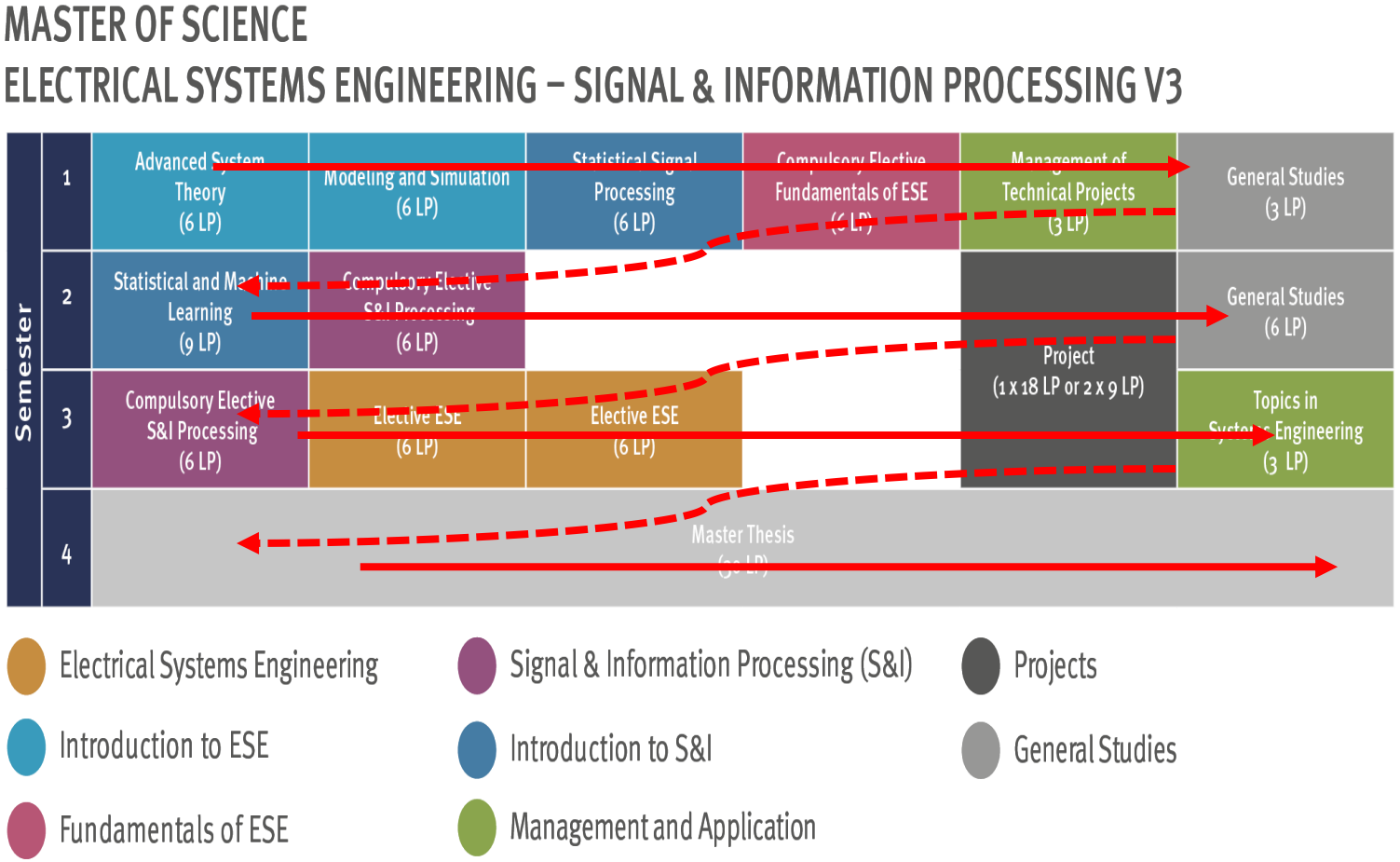
How to Organize Your Time Schedule

Try to clear your funda-mental topics & prere-quisites first. → basis for elective courses

Mix difficult & easy topics when needed.

Learn/prepare with other students.

Get advise from study advisors!



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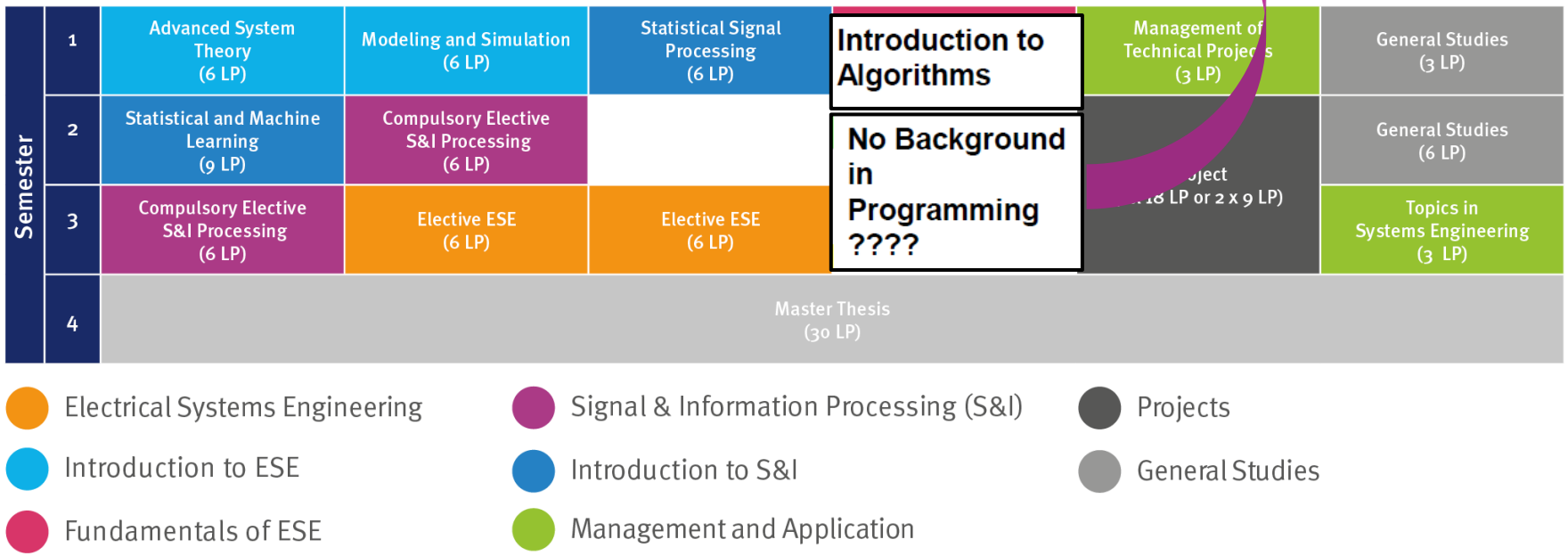
Studying at Different Speeds

https://www.hni.uni-paderborn.de/sse/lehre/c-programming (Self -Study)

L.048.92999
C++ Programming
Philipp Schubert



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Some Important Deadlines

- **Enrollment** for the current semester until **October 23**.
- **Registration** for courses in PAUL until **October 31**.
- **Deregistration** for courses in PAUL until **December 31**.
- **Registration** for examinations in PAUL from **October 22** until **Nov 26**.
- **Deregistration** for examinations in PAUL until **2 days before exam date**.

https://www.uni-paderborn.de/en/studies/paul-information-sites/deadlines-and-dates

Advisory Service for Students in Master ESE

Specialized Counseling

Ahnaf Akif

Shwetha Ganesh

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✉: studienberatung@ei.upb.de

ESE Office Hours:

Tue: 09:00 - 12:00

Thu: 13:00 - 16:00

Advisors

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Welcome Week

Any questions?

Thank you for your attention