Welcome to the Master Program in Electrical and Electronics Engineering
http://sel.epfl.ch

Prof. David Atienza, SEL Director
Agenda for Today

♦ 9h00 - 9h30
   General presentation – Prof. David Atienza

♦ 9h30 - 9h45
   IoT and Computer & Comm. Engineering – Prof. David Atienza

♦ 9h45 - 10h00
   Data & Signal Processing – Prof. Jean-Philippe Thiran

♦ 10h00 - 10h15
   EPFL Library – Ms Pascale Bouton

♦ 10h15 - 10h30
   Bioelectronics – Prof. Sandro Carrara

♦ 10h30 - 10h45
   Devices – Prof. Adrian Ionescu

♦ 10h45 - 11h00
   Circuits and photonics – Prof. Andreas Burg
Four Major Fields in EE at EPFL

To be awarded the Master degree in Electrical and Electronics Engineering, you have to follow a set of courses, projects and labs oriented around the four major scientific and technical field in EE:

- CIRCUITS AND DEVICES
- IoT AND COMPUTER & COMMUNICATION ENGINEERING
- INFORMATION SCIENCE AND SYSTEMS
- POWER AND ENERGY
Program Structure

♦ Total regular Master (4 semesters): 120 ECTS

1. Core courses and Options: 70 ECTS
   - Core courses: 12 ECTS min. from 25 ECTS
   - Options: complete up to 58 ECTS
     - Possible 30 ECTS Specialization or/and 30 ECTS Minor
     - Possible 30 ECTS Long internship (possible in addition to a Specialization, not to a Minor)

2. Practical labs & projects: 20 ECTS

3. Master project (4-6 months): 30 ECTS
Core Courses in EE (min. 12 ECTS)

♦ STATISTICAL INFERENCES AND MACHINE LEARNING 4 ECTS

♦ CONVEX OPTIMISATION 4 ECTS

♦ LOW POWER ELECTRONICS 4 ECTS

♦ SEMICONDUCTOR DEVICES I 4 ECTS

♦ SMART GRID TECHNOLOGIES 5 ECTS

♦ WIRELESS RECEIVERS: ALGORITHMS & ARCHITECTURES 4 ECTS
Specializations related to Circuits and Devices (30 ECTS)

♦ Microelectronics circuits and systems

♦ Electronic technologies and device-circuit interactions

♦ Bioelectronics
Specializations related to IoT and Computer & Communication Engineering (30 ECTS)

♦ Internet of Things (IoT)

♦ Wireless and Photonics Circuits and Systems
Specializations related to Information Science and Systems (30 ECTS)

♦ Internet of Things (IoT)

♦ Data Science and Systems

♦ Signal, Image, Video and Communication
Optional Minor (30 ECTS)

♦ In-depth focus on:
  ● Space Technology
  ● Biomedical Engineering
  ● Energy
  ● Material Sciences
  ● Management of Technology
  ● Etc.

♦ Registration by end of M1

♦ Set of optional courses, practical labs and projects
  ● To be done in parallel with other Master courses
  ● All Master courses can be distributed over 3 semesters

♦ Successful Specialization or/and Minor are mentioned in Master Diploma Supplement
Optional Courses

♦ Large choice of optional courses
  ● “Stand-alone”
  ● From the specializations
  ● From the core courses
  ● From other Schools (up to a max. of 11 ECTS), e.g.:
    • Computer Science
    • Communication Systems
    • Microengineering
    • ...

But with the permission of the section director…
Practical Labs and Projects (20 ECTS)

♦ Practical lab (M1, 4 ECTS)
  ● To be selected from a predefined list of SEL
  ● Usually related to the selected specialization

♦ Semester project (M2, 10 ECTS)
  ● Related to the selected specialization

♦ Humanities and Social Sciences projects (M1 & M2, 6 ECTS)
  ● [http://shs.epfl.ch](http://shs.epfl.ch)
Practical Labs (4 ECTS)

♦ Lab in Signal and Image Processing, Prof. Jean-Philippe Thiran

♦ Lab in Data Science, Dr Olivier Verscheure

♦ Lab in Microwaves, Prof. Anja Skrivervik

♦ Lab in Acoustics, Dr Hervé Lissek

♦ Lab on Apps Development for Tablets and Smartphones, Prof. David Atienza

♦ Lab in Microelectronics (EDA based design), Dr Adil Koukab

♦ Lab in Energy, Dr André Hodder
The Internship: Excellent Opportunity!

- **Students**
  - A Great incentive to ask oneself the right questions!
  - Familiarize with working life and environment
  - Immerse into Industry practice
  - Future Hiring opportunity

- **Companies**
  - Benefit from highly qualified students
  - A new insight on current issues, innovate!
  - Evaluate future employees

- **EPFL**
  - A direct link to industry
  - A new platform to start collaborations on the research level
  - Feedback from industry to improve the education of our students
Mandatory Internship or Master Project in Industry

- **Short Internship (STAP)**
  - Immersion into industry
  - Familiarize with company processes
  - Apply transversal skills
  - **Minimum duration of 8 weeks, up to 12 weeks**
  - Evaluation between student and industrial supervisor

- **Long Internship (SCS)**
  - Immersion into industry
  - Familiarize with company processes
  - Acquire specific competences
  - Apply and analyze transversal skills
  - **Minimum duration of 17 weeks, up to 6 months**
  - Written report to section

- **Master project in industry**
  - A research project in the company
  - Student applies the competences acquired during his master
  - Supervised by a Professor from an EPFL research lab
  - **25 week duration (+1 week vacation)**
  - Written report and oral defense
SEL Master Curriculum: Summary

Master Cycle (possible specialization or/and minor)
90 credits

- Master Project in Industry
  25 weeks
  30 credits

- M.Sc. Project in Academia
  17 weeks at EPFL
  30 credits

- Short Internship
  8-16 weeks

- M.Sc. Project in Industry
  17 weeks (up to 25)
  30 credits

- Short Internship
  8-16 weeks

Master cycle (possible specialization) including a long internship
90 credits

- Master Project in Academia
  17-25 weeks at EPFL
  30 credits

- Master Project in Industry
  25 weeks
  30 credits
Validation of 30 Credits for Long Internship (SCS)

Internship Activity and Transversal Skills Analysis Report

The activity report should be 3 to 5 pages long with the following structure:

1. Student’s internship search campaign
2. Internship activity and technical skills report
3. Transversal skills report and analysis

Prepare Your Internship Campaign

This fall semester
- Understanding recruiters (Date TBC)
- Reviewing the CV
- The motivation letter

Next spring semester
- The Job interview
- Communication and organization at work

Each course given 2x in English and 5x in French
Information and registration here: https://bookwhen.com/stages
Information and Contacts

☐ For further information,


☐ Depending on your inquiry, you can contact the following persons:

Sebastian Gautsch
STI
Internship Coordinator

Philippe Gay-Balmaz
SEL
Adjunct to the SEL Director

Mrs Suzanne Manné
SEL
Administration
Master Project (30 ECTS)

♦ 4-6 months

♦ In-depth work on a well-defined problem
  ● Usually related to the selected orientation

♦ Can be carried out in:
  ● One of our research laboratories
  ● A company (except if you already did a credited long internship)
  ● Another university (in Switzerland or abroad)
Procedure for Master Project Registration

1. Finding a master/semester project
   - Visit web pages of EE labs. (next semester)
   - Make sure Professor in charge of the project is affiliated with the SEL
   - If it is not the case, please submit your project to the director of the SEL for approval

2. Contacting the Professor in charge of the project
   - Book your project with the Professor as soon as the date is published by the secretary
   - Discuss your project with the Professor

3. Registration with IS-Academia
   - Register with IS-Academia
   - Save and print your registration
   - IMPORTANT: only the registration with IS-Academia is authoritative

29 possible labs at SEL to choose from…
Possible EE Research Labs for Projects

IoT and COMPUTER & COMMUNICATION ENGINEERING

♦ ESL – Embedded Systems Laboratory (Prof. Atienza)
♦ LWE – Laboratory of Wave Engineering (Prof. Fleury)
♦ LO – Optics laboratory (Prof. Psaltis)
♦ PHOSL – Photonic Systems Laboratory (Prof. Brès)
♦ TCM – Telecommunications Circuits Laboratory (Prof. Burg)
♦ GR-LT – Optical Fibers Group (Prof. Thévenaz)
Possible EE Research Labs for Projects

INFORMATION SCIENCE AND SYSTEMS

♦ ASL – Adaptive Systems Laboratory (Prof. Sayed)
♦ New lab from Sept. 2020: Information, Learning & Physics Laboratory (Prof. Krzakala)
♦ LIDAP – IDIAP Laboratory (Prof. Bourlard)
♦ LIONS – Laboratory for Information and Inference Systems (Prof. Cevher)
♦ LTS2 – Signal Processing Laboratory 2 (Prof. Vandergheynst)
♦ LTS4 – Signal Processing Laboratory 4 (Prof. Frossard)
♦ LTS5 – Signal Processing Laboratory 5 (Prof. Thiran)
♦ MMSPL – Multimedia Signal Processing Lab (Prof. Ebrahimi)
♦ GR-JMV – Applied Signal processing group (MER Vesin)
Possible EE Research Labs for Projects

CIRCUITS AND DEVICES

♦ CLSE – Laboratory of Life Science Electronics (Prof. Guiducci)
♦ ESL – Embedded Systems Laboratory (Prof. Atienza)
♦ LANES – Laboratory of Nanoscale Electronics and Structures (Prof. Kis)
♦ LPQM – Laboratory of Photonics and Quantum Measurements (Prof. Kippenberg)
♦ LSI – Integrated Systems Laboratory (Prof. De Micheli)
♦ INL – Integrated Neurotechnologies Laboratory (Prof. Shoaran)
♦ LMAM – Laboratory of Movement Analysis and Measurements (Prof. Aminian)
♦ NANOLAB - Nanoelectronic Devices Laboratory (Prof. Ionescu)
♦ GR-CD – RFIC Group (Prof. Dehollain)
♦ POWERLAB – Power and Wide-band-gap Electronics Research Laboratory (Prof. Matioli)
♦ GR-MM – Multimedia Architecture Research Group (MER Mattavelli)
Possible EE Research Labs for Projects

POWER AND ENERGY

♦ DESL – Distributed Electrical Systems Laboratory (Prof. Paolone)
♦ PEL – Power Electronic Laboratory (Prof. Dujic)
♦ POWERLAB – Power and Wide-band-gap Electronics Research Laboratory - (Prof. Matioli)
♦ Electromagnetic Compatibility Group (Prof. Rachidi)
♦ Power Systems Group (MER Cherkaoui)
♦ Real-Time Coordination & Distributed Interaction Systems Group (MER Gillet)
Possible Other EPFL Research Labs for Projects

SPACE CENTER
♦ CTS - Space Center

+ Other laboratories outside EE
♦ Laboratory for Hydraulic Machines
♦ Systemic Modelling Laboratory
♦ Laboratory of Computational Neuroscience
♦ Laboratory of Nonlinear Systems
♦ Processor Architecture Laboratory
♦ Integrated Actuators Laboratory
♦ Laboratory of Biomedical Optics
♦ Laboratory for Computer Communications and Applications
♦ …
Contact Persons

♦ Prof. David Atienza (Section Director, ELG 130)

♦ Dr Philippe Gay-Balmaz (Adjunct to the Director, ELB 111)

♦ Mrs Suzanne Manné (Administrative Assistant, ELB 110)

♦ Prof. Andreas Burg - MICROELECTRONIC CIRCUITS AND SYSTEMS

♦ Prof. Elison Matioli - ELECTRONIC TECHNOLOGIES AND DEVICE-CIRCUIT INTERACTIONS

♦ Prof. Carlotta Guiducci - BIOELECTRONICS

♦ Prof. David Atienza - INTERNET OF THINGS (IoT)

♦ Prof. Pascal Frossard - DATA SCIENCE AND SYSTEMS

♦ Prof. Jean-Philippe Thiran - SIGNAL, IMAGE, VIDEO AND COMMUNICATION

♦ Prof. Camille Brès - WIRELESS AND PHOTONIC CIRCUITS AND SYSTEMS

♦ Prof. Mario Paolone - ENERGY : SMART GRIDS SCIENCE AND TECHNOLOGY

Details here: [https://sti.epfl.ch/research/institutes/iel/governance-sel/](https://sti.epfl.ch/research/institutes/iel/governance-sel/)
Questions?
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