Master of Science in
ELECTRICAL AND ELECTRONIC ENGINEERING

2-year program - 120 ECTS

- Master's thesis 30 ECTS
- Core courses 20 ECTS
- Labs and Projects 20 ECTS
- Courses and Projects for Specialization or MINOR 30 ECTS
- Optional courses according to list 20 ECTS
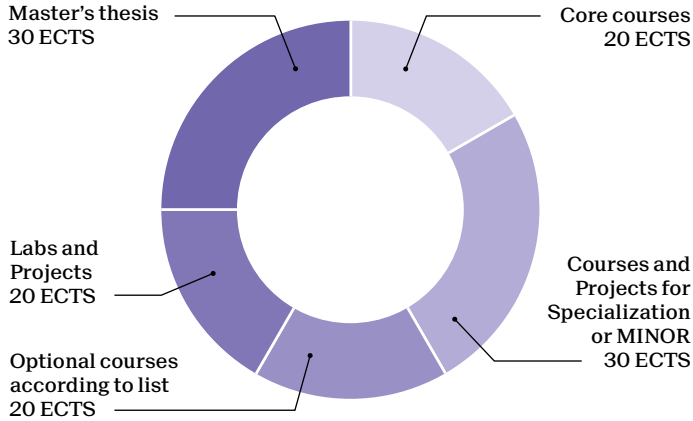
Labs and Projects	A	B	C	D	E	F	G	H	Credits 20
Lab in Acoustics									4
Lab in data science									4
Lab in EDA based design									8
Lab in Electrical Energy Systems									4
Lab in Microelectronics									5
Lab in Microwaves									4
Lab in Signal and Image Processing									4
Lab on Apps Development for Tablets and Smartphones									4
Project in the selected specialization	A	B	C	D	E	F	G	H	10
Project in human and social sciences									6

Possible Minors:
- Biomedical Technologies
- Computational Science & Engineering
- Energy
- Management, Technology and Entrepreneurship
- Science, Technology and Area Studies
- Spatial Technologies

or 30 ECTS internship (4-6 months)

Possible specializations:
A Microelectronics circuits and systems
B Electronic technologies and device-circuit interactions
C Bioelectronics
D Internet of Things (IoT)
E Data Science and Systems
F Signal, Image, Video and Communication
G Wireless and Photonics Circuits and Systems
H Energy: Smart Grids Technologies

Industrial internship
The program includes a minimum 8-week long compulsory internship.
A longer internship may be done instead of a specialization or in combination with the Master's thesis.

School of Engineering
master.epfl.ch/electricalengineering
contact: philippe.gay-balmaz@epfl.ch

Core courses	A	B	C	D	E	F	G	H	Credits
A network tour of data science	A			D	E	F			4
Convex optimization				D	E			H	4
Low power electronics	A	B	C	D					4
Semiconductor devices I	A	B					G	H	4
Smart grids technologies								H	5
Wireless receivers: algorithms and architectures	A		C	D		F	G		4

Specialisation and Optional courses	A	B	C	D	E	F	G	H	20/30
Adaptation and learning					E	F			4
Advanced analog and RF integrated circuits design I	A		C				G		2
Advanced analog and RF integrated circuits design II	A		C				G		2
Advanced computer architecture	A								4
Advanced lab in Electrical Energy Systems								H	4
Advanced lab in Electrical Engineering									4
Advanced multiprocessor architecture	A			D					6
Advanced VLSI design	A			D					4
Advanced wireless receivers	A			D			G		3
Analog circuits design	A		C	D			G		2
Analog Circuits for Biochip	A		C	D					3
Applied data analysis				D	E				6
A network tour of data science			C						3
Applied machine learning			C						4
Architecture des systems-on-chip	A								4
Audio						F			3
Automatic speech processing					E	F			3
Bioelectronics and biomedical microelectronics	A	B	C	D					3
Bioelectronics and implantable biomedical microelectronics			C						3
Biological modeling of neural networks			C						4
Biomedical signal procesing				D		F			6
BioMEMS			C						2
Biometrics					E	F			3
Biomicroscopy I	A		C	D			G		3
Biomicroscopy II			C	D					4
Bio-nano-chip design			C	D					3
Brain computer interaction				D					3
Cellular and molecular biology I			C						3
Computational photography						F			5
Computer architecture	A								4
Data visualization					E				4
Deep learning				D	E	F			4
Design technologies for integrated systems	A	B	C	D		F			6
Discrete optimization				D	E			H	5
Distributed information systems				D		F		H	4
Distributed intelligent systems	A					F			5
Electrical filters	A		C				G		3
Electromagnetic compatibility								H	2
Embedded systems	A		C	D					4
Energy conversion and Renewable Energy								H	3
Energy storage systems								H	3
Flexible bioelectronics			C	D					3
Fundamentals and processes for photovoltaic devices								H	3
Fundamentals of biomedical imaging			C						4
Fundamentals of biosensors and electronic biochips		B							3
Fundamentals of neuroengineering			C						4
Fundamentals of VLSI design	A	B	C	D					4
Hardware systems modeling I, II	A			D			G		2
HF and VHF circuits and techniques I	A		C				G		4
HF and VHF circuits and techniques II	A		C				G		2
Hydropower plants: generating and pumping units								H	2
Image analysis and pattern recognition					E	F			4
Image and video processing				D		F			6
Imaging optics	A								3
Industrial automation								H	3
Industrial electronics II								H	4
Information theory and coding	A			D	E	F			7
Integrated circuits technology	A								2
Introduction to computer graphics						F			6
Large scale machine learning					E				4
Lasers: theory and modern applications	A						G		4
Low-power radio design for IoT	A			D			G		3
Machine learning	A				E				7
Mathematics of data: from theory to computation					E				4
Media security				D		F			6
Microwaves	A					F	G		4
Mobile networks				D					4
Model predictive control						F			3
Multivariable control and coordination systems								H	4
Nanoelectronics	A		C	D					2
Networked control systems				D				H	3
Optical communication	A			D		F	G		3
Optical detectors	A						G		3
Optical waves propagation	A					F	G		3
Optics laboratories I	A						G		4
Optique III									4
Optimal decision making				D				H	4
Photonic micro- and nanosystems	A								2
Photonic systems and technology	A					F	G		4
Physical models for micro and nanosystems	A								2
Physics of photonic semiconductors devices	A						G		4
Physiologie par systèmes I			C						4
Power systems dynamics								H	3
Power system restructuring and deregulation								H	3
Project in Electrical Engineering	A		C	D	E	F	G		10
Propagation of acoustic waves						F			3
Quantum Electrodynamics and Quantum Optics	A						G		4
Quantum optics and quantum information	A						G		4
Real-time embedded systems	A			D					4
Scaling laws in micro- and nanosystems			C						4
Selected topics in advanced optics					E				3
Semiconductor devices II	A	B					G		4
Semiconductor physics and light-matter interaction									4
Seminar in physiology and instrumentation									4
Sensors in medical instrumentation			C						3
Signal processing for functional brain imaging						F			3
Smart sensors for IoT				D					4
Social media						F			2
Space mission design and operations									2
Statistics for data science									6
Summer workshop									4
Synthesis, analysis and verification	A								6
Systems and architectures for signal processing	A								4
TCP/IP Networking								H	5
Test of VLSI systems	A								2
Transdisciplinary project									4
Wave propagation along transmission lines								H	2