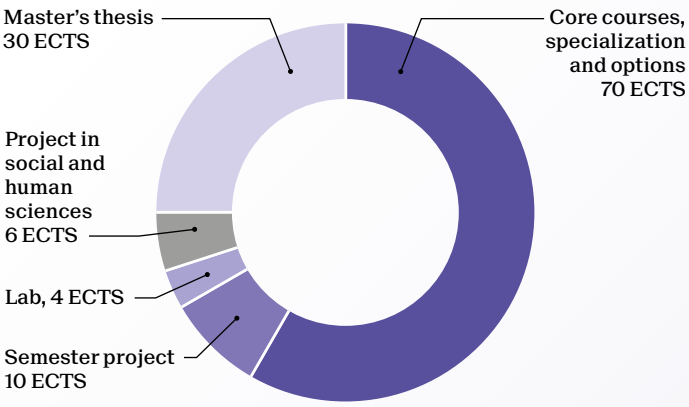
Master of Science in

ELECTRICAL AND ELECTRONIC ENGINEERING

2-year program - 120 ECTS



	Specialization							Credits
Core courses (min. 12 credits)	**A**	**B**	**C**	**D**	**E**	**F**	**G**	
Convex optimization				D	E			5
Fundamentals of analog and mixed signal VLSI design	A	B	C	D			G	4
Fundamentals of inference and learning	A	B		D	E	F		4
Semiconductor devices I	A	B					G	4
Smart grids technologies								5
Wireless receivers: algorithms and architectures	A		C	D		F	G	4

Lab	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**4**
Lab in acoustics								4
Lab in EDA based design				D				4
Lab in electrical energy systems								4
Lab in microwaves	A						G	4
Lab in nanoelectronics	A	B						4
Lab in signal and image processing				D				4
Lab on app development for tablets and smartphones				D	E			4
Lab on cell-free synthetic biology			C					4
Large-scale data science for real-world data				D				4

Students may choose a 30 ECTS specialization in:

A Microelectronic 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 photonic circuits and systems

Or / and a 30 ECTS minor included in the 120 ECTS.
Recommended minors with this Master:

- Biomedical technologies
- Computational science and engineering
- Energy
- Management, technology and entrepreneurship
- Space technologies

Industrial internship

The program includes a compulsory industrial internship with a minimal duration of 8 weeks (30 ECTS if extended to 4-6 months).

School of Engineering

go.epfl.ch/master-electrical-electronic-engin
contact: philippe.gay-balmaz@epfl.ch

	Specialization							Credits
Options	**A**	**B**	**C**	**D**	**E**	**F**	**G**	
Adaptation and learning					E	F		4
Advanced A/MS VLSI: A-to-D Converter	A	B	C					3
Advanced analog integrated circuit design	A	B	C	D			G	3
Advanced computer architecture	A							8
Advanced lab in electrical energy systems								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 for biochip	A		C	D				3
Applied biomedical signal processing				D		F		4
Applied data analysis				D	E			8
Applied machine learning				D	E			4
Audio						F		3
Automatic speech processing					E	F		3
Basics in bioinstrumentation			C					4
Bioelectronics and biomedical microelectronics	A	B	C	D				3
Biomicroscopy I, II	A		C	D			G	7
Bio-nanochip design			C	D				3
Causal inference				D	E	F		4
Cellular and molecular biology I			C					3
Classical and quantum photonic transducers								3
Computational neurosciences: neuronal dynamics			C					5
Computational photography						F		6
Computer graphics						F		6
Data visualization					E			6
Deep learning				D	E	F		4
Deep learning for autonomous vehicles								6
Deep learning for optical imaging					E	F		3
Design technologies for integrated systems	A	B	C	D		F		6
Discrete optimization				D	E			5
Distributed information systems				D		F		6
Distributed intelligent systems	A					F		5
Electromagnetic compatibility								2
Embedded systems design	A			D				6
Energy conversion and renewable energy								4
Energy storage systems								3
Fundamentals and processes for photovoltaic devices								3
Fundamentals of biomedical imaging			C					4
Fundamentals of biosensors and electronic biochips			C	D				3
Fundamentals of VLSI design	A	B	C	D				4
How to design for value for space applications								2
Hydropower plants: generating and pumping units								2
Image analysis and pattern recognition					E	F		4
Image and video processing				D		F		6
Imaging optics	A							3
Industrial automation								3
Industrial electronics I, II								8
Information theory and coding	A			D	E	F		8
Introduction to the design of space mechanisms								2
Lasers: theory and modern applications	A						G	4
Lessons learned from the space exploration								2
Machine learning	A				E			8
Mathematics of data: from theory to computation					E			6
Media security				D		F		6
Microwaves, the basics of wireless communications	A		C			F	G	4
Mobile networks	A			D				8
Model predictive control				D				4
Multivariable control								4
Nanoelectronics	A		C	D				2
Networked control systems				D				3
Network machine learning				D	E	F		4
Neural interfaces			C					6
New space economy								3
Optical detectors	A						G	3
Optics laboratories I	A						G	3
Optimal decision making				D				4
Photonic systems and technology	A					F	G	4
Physical models for micro- and nanosystems	A							2
Physics of photonic semiconductor devices	A						G	4
Power system restructuring and deregulation								3
Power systems dynamics								3
Project in electrical engineering	A		C	D	E	F	G	10
Projet en technologies spatiales								12
Quantum electrodynamics and quantum optics	A						G	6
Quantum optics and quantum information	A						G	6
Radio frequency circuits design techniques	A		C				G	4
Reinforcement learning								6
Scaling laws in micro- and nanosystems			C					2
Selected topics in advanced optics	A						G	3
Semiconductor devices II	A	B					G	4
Semiconductor physics and light-matter interaction								4
Seminar in physiology and instrumentation								2
Sensors in medical instrumentation			C					3
Smart sensors for IoT				D				3
Social media						F		2
Space mission design and operations								2
Space propulsion								3
Spacecraft design and system engineering								4
Statistical inference and machine learning	A	B		D	E	F		4
Statistics for data science								6
Systems and architectures for signal processing	A							2
Systems programming for systems-on-chip	A		C	D				6
TCP/IP networking								8
Test of VLSI systems	A							2
Transdisciplinary project								4
Wave propagation along transmission lines						F		2