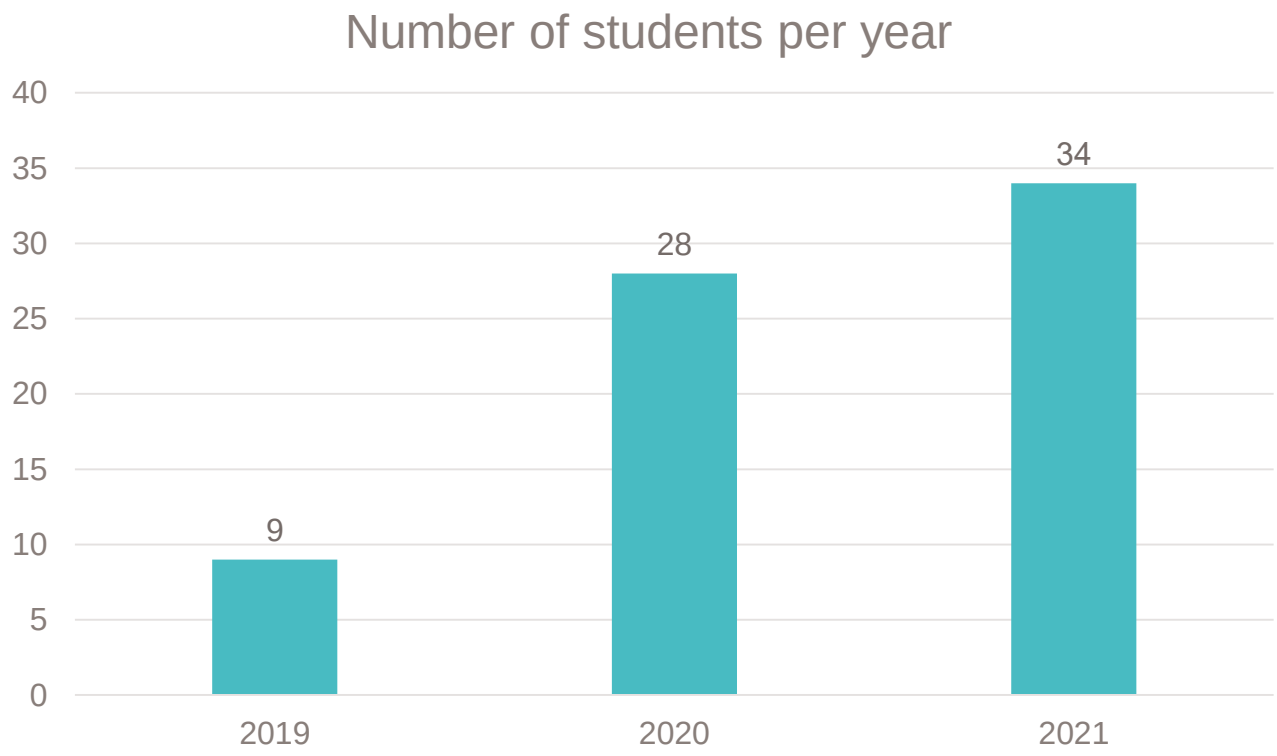
EPFL
mt
microtechnique
microengineering
section

7 mars
2022

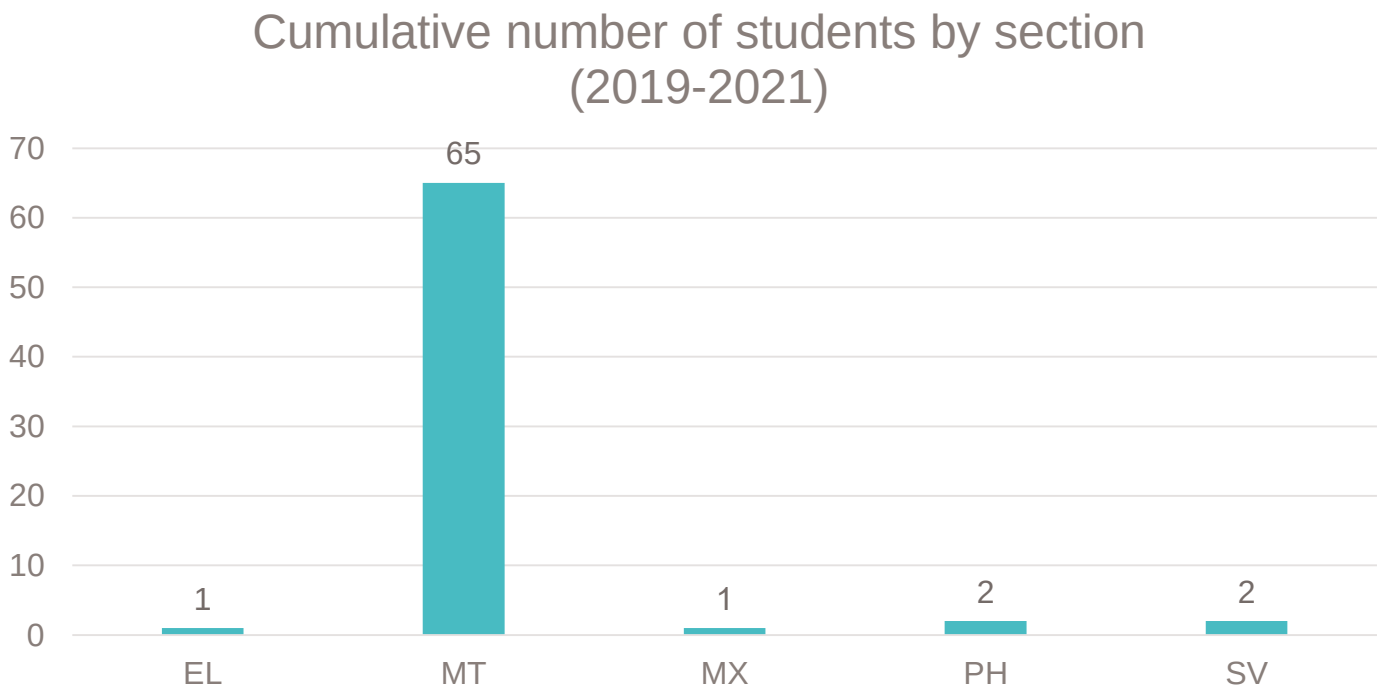
Mineur en Photonique

Faculté des Sciences
et Techniques
de l'Ingénieur (STI)

Statistics – The photonics Minor exists since 2019



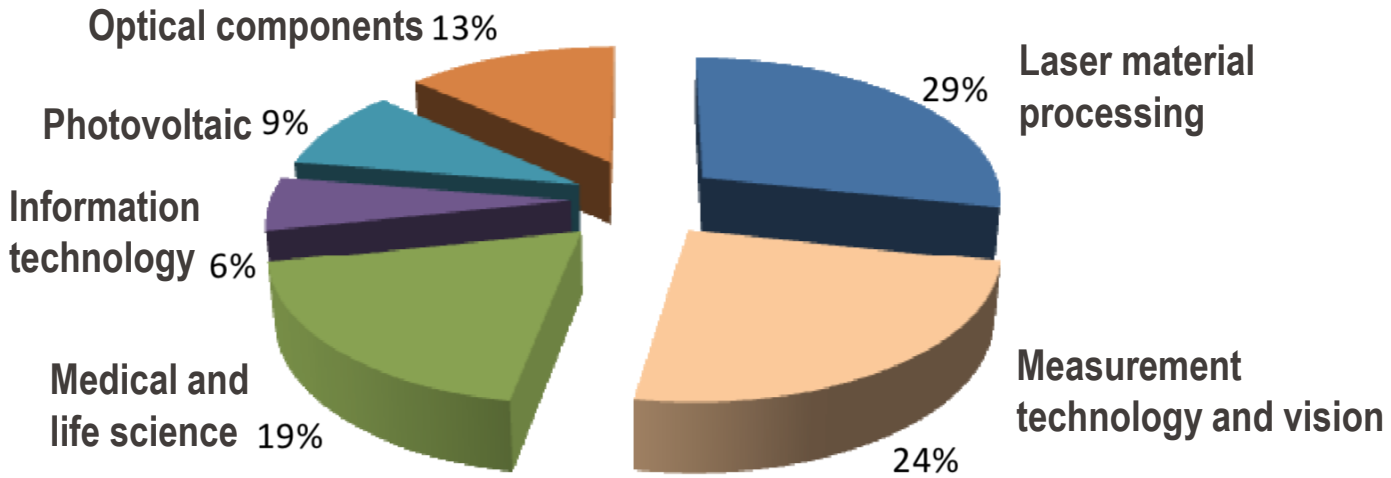
Statistics – It is very popular among MT students



Photonics and industry

- One of the five key enabling technologies identified by the European Commission
- € 447 billion world market, growing at a rate of 6.2%
- CHF >4 billions Swiss photonics industry, ~ 100 companies,

  >10'000 highly skilled collaborators:

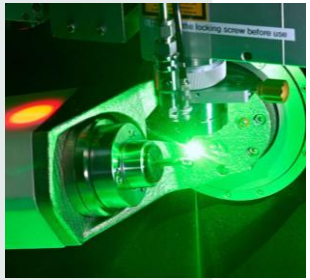
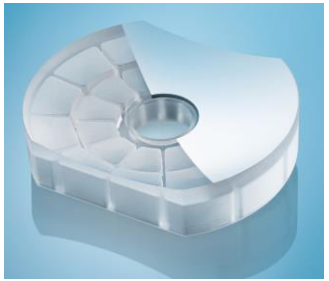
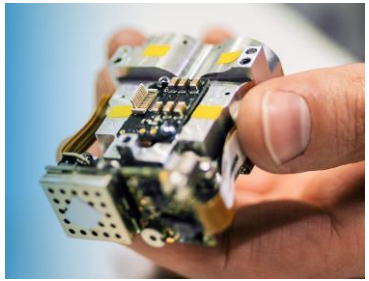
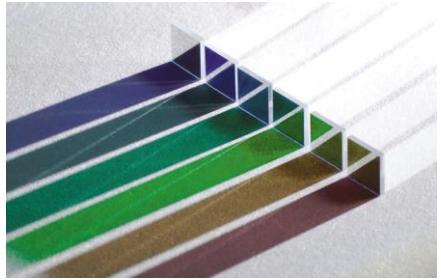


SWISS PHOTONICS

Photonics in Switzerland – e.g. Optical components[5]

- CHF 400 Mio turnover
- Some large companies and many Small & Medium Enterprises:

  ABB, Alpes Laser, ams-OSRAM, Axetris, Balzers Optics, Lumentum Ultrafast Lasers, Escatec, Exalos, Feinwerkoptik Zünd , Fiberoptic, FISBA, Fischer Connectors, Heptagon/AMS, id Quantique, IMT Masken und Teilungen, Industrial Laser Electronics and Engineering, Insolight, Leica, Leister, LESS, Logitech, Mikrop, Omnisens, Onefive, OVD-Kinegram, Silitec Fibers, Sinar, Rainbow Photonics, Schott Suisse, Spectros, Suss Microoptics, SwissOptic, Thin Film Physics, Time-Bandwidth Products, Victor Kyburz, Volpi, Vectronix WZW Optic, Xenlux, Zünd Precision Optics… … and many, many more !


SWISS PHOTONICS

Context for the Minor in Photonics

- Photonics is widespread at EPFL: Physics, Chemistry, Microengineering, Electrical Engineering, Bioengineering, Architecture…
- Very successful Doctoral Program in Photonics
- Large photonics faculty body in the Microengineering Section, where photonics is one of the focuses
- The minor in photonics bundles these competencies to propose a high level photonics degree

Objectives

- Educate students in the science of optics and photonics
- Prepare the students for their future in industry or academia
- Propose a balanced study plan between theory and practical work

What, How and with Whom?

- Choose 20 ECTS (6-7 courses) from 98 ECTS (30 courses) and **a lot of freedom**

  + Project in photonics (10 ECTS)
- Three tracks: Foundations of photonics, Applied photonics, Biomedical photonics
- Key laboratories for each track:

Foundations of photonics
K-Lab – Kippenberg
LAPD - Moser
LASPE – Grandjean/Butté/…
LBP - Roke
LIB – Unser
LWE – Fleury
NAM – Martin
PHOSL – Brès
PVLAB – Ballif/Haug
…

Applied photonics
EDMX – Hoffmann
LAPD – Moser
LO - Psaltis
LMTS – Briand
LNET – Tagliabue
LT – Thévenaz
LWE – Fleury
NAM - Martin
PHOSL - Brès
PVLAB – Ballif/Haug
….

Biomedical photonics
BIOS - Altug
EDCH - Wagnieres
LAPD - Moser
LBEN - Radenovic
LIB - Unser
LO - Psaltis
MIPLAB – Van De Ville
PTBIOP - Seitz
LBP – Roke
…

Proposed lectures in 2022/2023

Foundations of photonics

Laser fundam. and applications for engineers
Lasers: theory and modern applications
Nonlinear optics
Optical communications
Optics laboratories I and II
Optique III
Photonic systems and technology
Physics of photonic semiconductor devices
Quantum physics III and IV
Quantum electrodynamics and quantum optics
Quantum optics and quantum information
Selected topics in advanced optics
Semiconductor physics and fundamentals of electronic devices

Applied photonics

Advanced materials for photovoltaics and lighting
Fundamentals & processes for photovoltaïc devices
Fundamentals of biophotonics
Imaging optics and design
Image processing I and II
Laser microprocessing
Laser fundam. and applications for engineers
Optical detectors
Optical communications
Optics laboratories I and II
Organic and printed electronics
Photonic micro- and nanosystems
Photonic systems and technology
Selected topics in advanced optics
Technologie des microstructures I

Biomedical photonics

Biomedical optics
Biomicroscopy I and II
Fundamentals of biophotonics
Image processing I and II
Imaging optics and design
Laser fundam. and applications for engineers
Optics laboratories I and II
Photomedicine

Further information

please do not hesitate to
contact me
olivier.martin@epfl.ch

... and don't forget, the photon makes life fun and colorful!