

Master degree Nanophysics and Advanced Optics

Developed with International partnership
(France, Lebanon, Morocco, Poland, Tunisia, Ukraine)

Scientific program

- Experimental, theoretical and modeling expertise in condensed matter physics and materials science.
- Nanoscale and mesoscopic materials for electronic, optic and magnetic applications
- Advanced optical methods (coherent imaging, ultrafast spectroscopy, ...)
- Selected applications in emerging technologies (carbon nanostructures, plasmonics, spintronics, photovoltaics, multiferroics, smart materials, opto-acoustics, ...)

Academic staff

- Department of Physics of the Faculty of Sciences and Technology of Le Mans University
- Institute of Molecules and Materials of Le Mans – Le Mans University and National Scientific Research Center CNRS,
- National Engineering School (Sensors, Instrumentation, Vibro-acoustics, Metrology) – ENSIM Le Mans University,
- International Experts and invited Professors in the field of functional nanostructures, optical engineering and solid state physics.

Organization

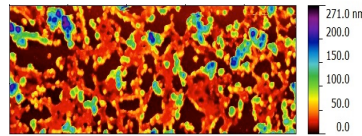
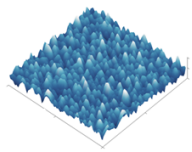
- 4 semesters with theoretical learning, practice exercises and projects in high-level research laboratories or R&D industries.

Career opportunities

- Scientific careers in academic institutions and industrial R&D sectors
- Engineer careers in research centers and manufacturing
- Project managers (materials, optics, instrumentation , metrology)
- Alumni : ST-microelectronics, Valéo, CEA, LNE, ONERA, Renault, University, CNRS.

Admission requirements

- Bachelor's degree in physics, physical-chemistry, engineering



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Program

Semester 1 (30 ECTS)

Quantum mechanics (1 ECTS) - refresher
Optics (1 ECTS) - refresher
Waves - propagation (1 ECTS) - refresher
Solid state physics I (4 ECTS)
Statistical Physics (5 ECTS)
Quantum Mechanics I (3 ECTS)
Mathematics and numerical methods (4 ECTS)
Crystallography and scattering methods (4 ECTS)
Signal processing I (2 ECTS)
Anisotropic optics and optoelectronics (3 ECTS)
English (2 ECTS)

Semester 2 (Choice of 30 ECTS)

Digital Electronics (3 ECTS)
Spectroscopic methods (3 ECTS)
Quantum Mechanics II (2 ECTS)
Solid state physics II (2 ECTS)
Atomic and Molecular Physics (3 ECTS)
Introduction to nonlinear optics (2 ECTS)
English (2 ECTS)
Socio-professional practices (1 ECTS)
Magnetism (3 ECTS)
Laboratory practice (4 ECTS)
Two units to choose among four
Instrumental Optics (3 ECTS)
Physics of complex fluids (3 ECTS)
Data acquisition (3 ECTS)
Nanomaterials for emerging technologies (3 ECTS)

Semester 3 (Choice of 30 ECTS)

Physics of solid and surfaces (2 ECTS)
Advanced Diffraction & Diffusion Techniques (3 ECTS)
Microtechnologies - Microsystems (2 ECTS)
Nanophotonics (2 ECTS)
English (2 ECTS)
Microscopy techniques (2 ECTS)
Intellectual property and innovation (1 ECTS)
Advanced instrumentation in optics (2 ECTS)
Nanophysics & Nanomagnetism (3 ECTS)
Electronic transport & of ultrafast phenomena (3 ECTS)
Modeling of Nanomaterials (2 ECTS)
Coherent imaging (3 ECTS)
One unit to choose among four
Plastic Electronics (3 ECTS)
Molecular photonics (3 ECTS)
Optoacoustics and applications (3 ECTS)
Soft Matter physics (3 ECTS)

Semester 4 (30 ECTS)

Research work in Laboratory in France or in European partner universities

Contact & informations :

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