

Master of Optics, Image, Vision Optics in Surface and Interface Multimedia Studies Science and Engineering (SISE OPTICS)

Master of Science, Technology, Health
Optics, Image, Vision, Multimedia Honours
Optics in Surface and Interface Science and Engineering (SISE OPTICS) Studies

Objectives

The training course is based on basic learning, practical learning and advanced learning at the crossroads between optics and IT. It provides gradual specialisation to train professionals to be able to explore a research or engineering activity in disciplinary fields related to applied physics, optics, photonics, fibre optic metrology, micro and nano surface structuration, optical, physical and mathematical modelling and characterisation of surfaces and structured interfaces, light-matter interaction modelling, instrumentation, non-destructive industrial characterisation and control, solar power, vision, image and colour processing and analysis and 2D and 3D multimedia technologies with a more or less pronounced specialisation in these fields during the course. The teaching staff also strives to provide a course that suits the industry's needs, is open to innovative technology (nanotechnology, augmented traceability, colour imaging and multimedia application) and focuses on vocational training (phototonic instrumentation, control, analysis and image processing).

The "Science and Engineering of Surfaces and Interfaces" (SISE) speciality was created by the LABEX SISE-MANUTECH to offer the full set of academic courses and teach a knowledge-based approach in the field of Surface and Interface Science and Technology.

The course provides students with state-of-the-art expertise in:

- > Surface and Interface properties
- > The techniques to characterise them
- > The techniques, mainly optical (laser processing) to modify them like in the picture below

Who's it for?

Entry requirements

- > Prepare your Master application
- > Application terms

What's next?



Prospects

The SISE Master is designed to address the industries' needs and challenges. It also opens the doors to international and challenging career opportunities, since on the international job market there is demand for postgraduates related to surface and interfaces: properties, characterisations, applications and modifications (mainly optical fs-laser).

Course

M1 SEMESTER 7	Credits	Lecture	Tutorial	Practical
Module 1 GENERAL CULTURE AND PREPARATION FOR PROFESSIONAL MODULE	5			
English	2		26	
Preparation for Professional Life 1	1		12	
Matlab	1			12
Labview	1			12
MODULE 2 LASER MATTER INTERACTION	7			
From the atomic structure to the dielectric function	4	20	20	
Photon-atom coupling	3	14	16	
MODULE 3 OPTICAL DESIGN	5			
Optical design	4	23	16	
Introduction to Zemax	1			12
MODULE 4 FOURIER OPTICS	5			
Introduction to Fourier optics	3	14	14	8
Physical optics	2	12		
MODULE 5 OPTICS IN	5			

CONDENSED PHASE				
Non-linear optics	2	10	14	
Optics of anisotropic media	3	10	12	8
MODULE 6 LIGHT RADIATION MEASUREMENT	3			
Introduction to radiometry	1	6	6	
Colorimetry	2	12	12	

M1 SEMESTER 8	Credits	Lecture	Tutorial	Practical
Module 1 GENERAL CULTURE AND PREPARATION FOR PROFESSIONAL LIFE	5			
English	2		26	
Preparation for Professional Life 2	1		12	
IT programming and languages	2	16	8	
MODULE 2 LASER AND LASER MATTER INTERACTION	6			
Laser physics	4	14	14	12
Collective behaviour of matter under electromagnetic radiation	2	12	12	
MODULE 3 OPTICS AT INTERFACES	5			

Introduction to guided optics	3	10	8	12
Thin films	2	10	10	4
MODULE 4 RADIOMETRY, SOURCES AND SENSORS	4			
Radiometry of optical systems and surfaces	2	12	12	
Radiometry of surfaces and media	2	15	12	
Module 5 INTERNSHIP IN LAB OR INDUSTRY / Study and research work (over 3 month placement)	10			

M2 SEMESTER 9	Credits	Lecture	Tutorial	Practical
Module 1 GENERAL CULTURE AND PREPARATION FOR PROFESSION AL 3	5			
English - TOEIC certification	3		30	
Preparation for professional life 3	2	6	28	
MODULE 2 SURFACES AND INTERFACES	4			
What do you mean by surface?	2	10	10	

Non-optical properties of structured surfaces	2	8	8	
MODULE 3 CHARACTERISATION OF SURFACES	5			
Optical and near-field characterisation techniques	3	10	10	16
Surface and interface analysis	2	12	8	4
MODULE 4 SURFACE STRUCTURING	4			
Laser processes for material structuring	2	6	12	
Micro-nano-structuring of surfaces	2	12	12	
MODULE 5 ELECTROMAGNETIC MODELLING AND PLASMONICS	5			
Electromagnetic modelling of micro-nano-structured surfaces	3	14	18	
Nanoplasmonics	2	12	12	
MODULE 6 COLOUR AND MULTI- SPECTRAL IMAGING IN COMPUTER VISION	4	18	12	6
MODULE 7 MATERIAL APPEARANCE	3			
Light scattering for material appearance	1	6	6	

Appearance metrology & perception	2	9	9	
Optional Energy module, choice of additional options OR module to replace the advanced module included in S4. Choice of 3 ECTS from A, B or C	3			
A-LED and solar cell physics	3	18	9	
B- Solar energy technology and use	2	12	6	
B- Research department into lighting design	1		12	
C- Colour reproduction	1	6	6	
C-Security printing project	1			8
C-Visual Cryptography	1	6	6	

M2 SEMESTER 10	Credits	Lecture	Tutorial	Practical
Master Thesis module: internship (5-6 month placement)	27			
Master Thesis: Module advanced (taken in S3)	3			