Presentation of the license training courses of Physics given in Matter sciences:

You may be here because you have wondered what you can do with a bachelor's degree in experimental science, mathematics or mathematical techniques. Thanks to a solid theoretical and practical training, students who enroll in the undergraduate programs in physics or chemistry in the field of science of materials develop scientific and professional skills and they become generalists in science of materials. A license in physics or chemistry from the SM domain opens up a number of additional opportunities. Thus, you can occupy the functions of control, research and development in the industry, but you can also go further with your studies. The most popular pursuit of studies is that of the master's (BAC + 5 years of study).

Several masters are offered at the SM department level:

For physics course:

- Master in applied physics
- Materials physics master

For the chemistry course:

- Master in organic chemistry
- Master in inorganic chemistry

1. Physical license of materials

The first year (L1) of the training cycle is governed by a common foundation of both physics and chemistry pathways. The physics course is offered to you from the second year (L2). With a very focused focus on in-depth knowledge in physics of materials. The physics of materials license training cycle leads to a diploma which will be issDTU at the end of the course in the third year L3.

1.1. Training objectives

At the end of the training and through the knowledge acquired of the atomic and nuclear structure of matter, the principles of statistical physics, thermodynamics, electromagnetism and quantum mechanics and in particular their basic mathematical formalisms, you will be able to:

- Identify the role and field of application of physics in different fields: materials technology, industrial environments and the social and economic issues associated with it.
- Solve physics problems by developing a scientific approach and using your theoretical knowledge in the various fields of physics.
- Continue your university course in the different masters offered.

1.2. Access conditions, admission and passage rules

1.2.1. Admission to L1

You must demonstrate skills in maths, physics and chemistry. Thus, if you hold a bachelor's degree in experimental science, mathematics or mathematical techniques, a registration in the 1st year (common foundation SM) most likely corresponds to your profile. The multidisciplinary education offered will allow you to acquire solid notions in mathematics, physics, and chemistry and computer science and to strengthen your level in English (an essential skill in a scientific course).

1.2.2. Admission to L2

A training cycle in physical materials license formally implies specialized training in disciplines that focus on different aspects of the physical world. Appropriate lessons compatible with your choice of physics course are therefore offered in L2. However, admission to L2 depends on a set of rules of passage established by the guardianship.

1.2.3. Admission to L3

Currently, the physical path within the SM department naturally leads to a license for the physical mention of materials. The different pedagogical approaches that you will be offered in L3 will allow you to gradually appropriate the scientific approach and to deepen your qualities to face professional life later. Thanks to the L3 internship conducted in research laboratories or in companies, you would be put in direct contact with the professional world. During this internship but also during practical work, you will have to use advanced scientific equipment. However, admission to L3 depends on a set of rules of passage established by the guardianship.

1.3. Gateway to other specialties

You can switch to the following options:

- Chemistry
- Energy
- Materials sciences
- Renewable Materials and Energies

1.4. Regional and national potential for employability:

The skills acquired by the end of the training will allow you to:

access to education (Ministry of National Education), access to research (Ministry of Higher Education and Scientific Research (MESRS) and Research Centers other than those under the MESRS), access the Research & Development laboratories of Economic Enterprises, access Master level training, introduce yourself to the world of public or private work life in all areas of materials. There are many and interesting outlets (renewable energies, hydrocarbons).

1.5 Program

1.5.1 First year common base (L1)

Abbreviations:

TU : Teaching Unit FTU: Fundamental Teaching Unit
MTU: Methodology Teaching Unit
DTU: Discovery Teaching Unit
TTU: Transversal Teaching Unit

	TU	Subject	المادة
Semestre 1	FTU	Chemistry 1: Structure of matter	كيمياء 1: بنية المادة
	FTU	Physics 1: Point mechanics	فيزياء 1 : ميكانيك النقطة
	FTU	Mathematics 1: Analysis and Algebra1	رياضيات 1 : تحليل و جبر 1
	MTU	Practical Work in Chimistry 1	أعمال تطبيقية كيمياء 1
	MTU	Practical Work in Mecanics1	أعمال تطبيقية فيزياء 1
	MTU	Computer science 1: office automation & Web Technology (7 weeks) / Introduction to algorithms (8 weeks)	إعلام آلي 1
	DTU	Choose a subject from: Discoveries of university work methods / Environment / biotechnology	إختيار مادة من بين : اكتشافات طرق العمل الجامعي / البيئة / البيوتكنولوجيا
	TTU	Foreign Langage 1	لغة أجنبية 1

	TU	Subject	المادة
Semestre 2	FTU	Mathematics 2: Analysis and Algebra 2	رياضيات 2: تحليل وجبر 2
	FTU	Physics 2: Electricity	فيزياء 2: كهرباء
	FTU	Chimistry 2: Thermodynamics and Chemical Kinetic	كيمياء 2 : الديناميك الحرارية و الكمياء الحركية
	MTU	I Computer science 2: Programming languages	إعلام آلي 2: لغات البرمجة
	MTU	Practical Work in Chimistry 2	أعمال تطبيقة كيمياء 2
	MTU	Practical Work in Electricity	أعمال تطبيقية في الكهرباء
	DTU	Choice of a subject among the three: Business economics / History of Sciences / Renewable energies	إختيار مادة واحدة من بين الثلاث: إقتصاد المؤسسة/تاريخ العلوم/الطاقات المتجددة
	TTU	Foreign Langage 2	لغات أجنبية 2

1.5.2 Second year Physical Materials License (L2)

	TU	Subject	المادة
Semestre 3	FTU	Analytic Mechanics	ميكانيكا تحليلية
		Vibrations & Waves	إهتزازات و أمواج
		Series & Differential Equations	السلاسل والمعادلات التفاضلية
		Geometrical Optics & Physics	البصريات الهندسية و الفزيائية
	MTU	Practical Work in Geometric and Physical Optics	أعمال تطبيقية في البصريات الهندسية والفيزيائية
		Practical Work in Vibration & Wave	أعمال تطبيقية إهتزازات و أمواج
		Numerical Methods and Programming	طرق رقمية و برمجة
	DTU	Choice of a subject among the four: Probability & Statistics / Physical crystallography / History of Physics / Mineral Chemistry	إختيار مادة من بين المواد التالية : إحتمالات وإحصاء /علوم فيزياء البلورات/تاريخ الفيزياء/كيمياء معدنية
	TTU	Foreign languages 3	لغات أجنبية 3

	TU	Subject	المادة
Semestre 4	FTU	Quantum Mechanics 1	ميكانيك كمي 1
		Electromagnetism	كهرومغناطيسية
		Function of Complex Variable	دوال ذات متغيرات عددية مركبة
		Thermodynamics	ديناميكا حرارية
	MTU	Fluid mechanics	ميكانيك الموائع
		Practical Work in Thermodynamics	أعمال تطبيقية في الديناميكا الحرارية
		General Electronics	إلكترونيات عامة
	DTU	Choice of a material among the four: Atomic & Nuclear Physics / Notion of Astronomy and Astrophysics / Spectroscopy / Analysis techniques	إختيار إحدى المواد التالية: فيزياء الأنوية و الذرات/مفاهيم في علم الفلك و الفيزياء الفلكية/ تحليل طيفي/طرق التحليل
	TTU	Foreign languages 4	لغات أجنبية 4

1.5.3 Third year Physical Materials License (L3)

	TU	Subject	المادة
Semestre 5	FTU	Quantum Mechanics 2	ميكانيك كمي 2
		Solide State Physics 1	فيزياء الجسم الصلب 1
		Statistical Physics	فيزياء إحصائية
	MTU	Practical Work in Solide State Physics 1	أعمال تطبيقية في فيزياء الجسم الصلب 1
		Numerical Analysis	تحليل رقمي
		Softwars	برامج
		Mathematics for Physics	رياضيات للفيزياء
	DTU	Choice of a subject among the three: Acoustics / Didactic processes / Restricted relativity	إختيار واحد من إحدى المواد التالية: الصوتيات /الإجراءات التعليمية/النسبية الجزئية
		Choice of a material among the three: Biophysics / Particle physics / Electronics of components	إختيار واحد من إحدى المواد التالية: فيزياء حيوية/ فيزياء الجزيآت/إلكترونيك المكونات
	TTU	Scientific English 1	إنجليزية علمية 1

	TU	Subject	المادة
Semestre 6	FTU	Semiconductor Physics	فيزياء أشباه النواقل
		Properties of crystal defects	خصائص الشوائب
		Solide State Physics 2	فيزياء الجسم الصلب 2
		Atomic Physics	فيزياء ذرية
	MTU	Analysis and characterization methods	طرق الوصف و التحليل
		Practical Work in Semiconductor Physics	أعمال تطبيقية في فيزياء أسباه النواقل
		Practical Work in Solide State Physics 2	أعمال تطبيقية في فيزياء الجسم الصلب 2
	DTU	Choice of a material among the six: Lasers / Plasmas / Nanotechnology / Optoelectronics / Solar cell / New materials and applications	إختيار مادة واحدة من بين: الليزر / البلازما / تقنية النانو/ الإلكترونيات الضوئية / بطاريات الطاقة الشمسية/ المواد الجديدة وتطبيقاتها
		Choice of a material from the two: Materials technology / Physical didactics	إختيار مادة واحدة من بين: تكنولوجيا المواد/ تعليمية الفيزياء
	TTU	Scientific English 2	إنجليزية علمية 2