

Faculty of Applied Sciences



MATR2

Ingénieur civil en sciences des matériaux (Diploma of the Second Cycle (Ingénieur civil) in Materials Science)



Programme management

MAPR Département des sciences des matériaux et des procédés

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Study objectives

Materials Science is a basic discipline for various engineering specialities. It is the foundation for research activities in numerous laboratories, elsewhere at UCL and in the world. The three-year engineering programme in Materials Science aims, firstly, to provide a wide and solid education. It also enables those who so wish, to acquire a thorough specialisation in one or several peak domains.

Admission conditions

The programme leading to a degree in Civil Engineering - Materials Science, is accessible to all students holding the first study cycle diploma ("candidature") in Civil Engineering. Industrial engineers and certain university degree holders in subjects relating to the Exact Sciences may also be entitled access, as may students with a foreign degree judged as being equivalent.

Admission procedure

The University admission and enrolment procedures are detailed in the section : "Access to studies" on the web page : <http://www.ucl.ac.be/etudes/libres/acces.html>

General structure of the programme

This 3 year programme covers, on the one hand, general and polyvalent courses and, on the other hand, specialised courses grouped into different "subject matters". The latter include a compulsory part and an substantial volume of options. This volume of options favours the easy acquisition of "minor" studies in other specialities (ELEC, MECA...). Important emphasis is placed on learning through research, for example in the context of the end of course thesis.

Programme content

To obtain the **Civil Engineering degree in Materials Science**, the students will have to take the following programme :

General and polyvalent courses

General courses

<u>FSA2140</u>	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
<u>FSA2300</u>	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
<u>FSA2323</u>	none[30h+15h] (4 credits) (in French)	Jean-Pierre Hansen, Yves Smeers
<u>FSA2240</u>	Gestion financière et comptable[30h+15h] (4 credits) (in French)	Philippe Grégoire
<u>INMA2701</u>	Applied mathematics : Signals and systems[30h+30h] (5 credits) (in French)	Luc Vandendorpe, Vincent Wertz

Polyvalent courses

<u>ELEC2751</u>	Electrical circuits and measurements[15h+15h] (3 credits) (in French)	Christian Eugène
<u>ELEC2752</u>	Electronics[30h+15h] (4 credits) (in French)	Hervé Buyse
<u>ELEC2754</u>	Electronics : advanced topics[15h+22.5h] (3 credits) (in French)	Hervé Buyse, Francis Labrique
<u>MECA2855</u>	Thermodynamics and energetics.[45h+30h] (6 credits) (in French)	Michel Giot, Hervé Jeanmart, Miltiadis Papalexandris
<u>MECA2901</u>	Continuum mechanics.[30h+30h] (5 credits) (in French)	François Dupret

Specialised courses**Complete modules**

- 30.01. Materials Science : basic studies.
 30.02. Materials Physics.
 30.03. Polymers.
 30.04. Metals and Ceramics.
 30.06. Characterisation of Materials and Chemical Analysis.

Shortened module

- 30.05. Mechanics of Solids and Materials

Options

Each student will make a choice of optional courses leading to a programme comprising between 58 and 64 credits in MATR 22 and MATR 23 with a minimum of 120 ECTS for the whole duration of these two years. In principal, the options may be chosen from among all the courses from the FSA or from other Faculties. The students' attention is particularly drawn to the options belonging to the materials (30.XX) and chemistry (40.XX) domains as well as the 60.01 and 90.02. subject groups. Any student who so wishes, is authorised to include a course from the Human Sciences on his options programme, to be chosen from MATR 22 or MATR 23.

Language course

During the second cycle, the students may follow various language courses organised by the ILV. According to the jurisprudence of the MATR Committee, one single course is recognised to the value of 3 ECTS from the total volume of the programme. A specific course, destined to improve the linguistic skills and the professional interactive communication capacities of the student, is especially organised for the FSA students.

ANGL2470 English communication skills for engineers[30h] (3 credits) Ahmed Adriouèche, Henri November, Severine Schmit

Apprenticeship in industry

The apprenticeship, for a minimal duration of three weeks, will be carried out between the last two technical years (MATR 22 and MATR 23) . This work experience is valued at 3 credits of the total calculation of their programme volume.

End of course thesis.

This work, done in the third year, represents a personal volume of work charge equivalent to 30 credits.

Programme per year of studies

At the beginning of the second technical year (MATR 22), the student will choose a study advisor in line with the rules established by the MATR Committee. The programmes presented below do not detail the optional courses. In addition to the compulsory courses, the student will complete his programme with options in line with the reglementation of the MATR programme constitution and in agreement with his study advisor. This programme will be submitted to the MATR Committee for approval.

MATR 21 First year

First quadrimester

<u>INMA2701</u>	Applied mathematics : Signals and systems[30h+30h] (5 credits) (in French)	Luc Vandendorpe, Vincent Wertz
<u>ELEC2751</u>	Electrical circuits and measurements[15h+15h] (3 credits) (in French)	Christian Eugène
<u>MAPR2805</u>	Introduction to materials science[45h] (4 credits) (in French)	Jean-Christophe Charlier, Roger Legras (coord.), Thomas Pardoën
<u>MECA2855</u>	Thermodynamics and energetics.[45h+30h] (6 credits) (in French)	Michel Giot, Hervé Jeanmart, Miltiadis Papalexandris
<u>MECA2901</u>	Continuum mechanics.[30h+30h] (5 credits) (in French)	François Dupret
<u>MAPR2110</u>	Introduction to materials physics[45h+30h] (6 credits) (in French)	Patrick Bertrand, Jean-Christophe Charlier (coord.), Arnaud Delcorte, Xavier Gonze, Luc Piraux, Gian-Marco Rignanese

Second quadrimester

<u>FSA2323</u>	none[30h+15h] (4 credits) (in French)	Jean-Pierre Hansen, Yves Smeers
<u>MAPR2381</u>	Macromolecular Chemistry[45h+30h] (6 credits) (in French)	Christian Bailly, Sophie Demoustier, Jacques Devaux, Pierre Godard, Alain Jonas, Roger Legras (coord.), Bernard Nysten
<u>MAPR2460</u>	INTRODUCTION TO MATERIALS CHARACTERIZATION[30h+15h] (4 credits) (in French)	Patrick Bertrand (coord.), Jacques Devaux, Alain Jonas, Bernard Nysten
<u>MAPR2473</u>	METALLURGICAL PHYSICO-CHEMISTRY[30h+60h] (7 credits) (in French)	Francis Delannay (coord.), Pascal Jacques

<u>MAPR2492</u>	Materials physics[37.5h+22.5h] (5 credits) (in French)	Vincent Bayot, Patrick Bertrand, Jean-Christophe Charlier, Xavier Gonze (coord.), Luc Piraux
<u>MECA2100</u>	Deformable solid mechanics.[45h+45h] (7 credits) (in French)	Issam Doghri

MATR 22 Second year

The second year programme comprises, in total, between 58 and 64 ECTS, including the options. At least 1 course must be chosen from among 3 of the 6 subject groups 30.02 to 30.06 and 40.03. The MAPR 2806 Great Industrial Processes course, may also be chosen instead of another course from the 40.03 subject group. It is allowed, subject to the agreement of the study advisor and the MATR Committee, to inverse the general and polyvalent studies courses from MATR22 to MATR23 or vice-versa.

First quadrimester

<u>ELEC2330</u>	Physics of electronics[30h+30h] (5 credits) (in French)	Vincent Bayot (coord.), Denis Flandre, Jean-Pierre Raskin
<u>ELEC2752</u>	Electronics[30h+15h] (4 credits) (in French)	Hervé Buyse
<u>MAPR2392</u>	Physics of polymeric materials[30h+30h] (5 credits) (in French)	Christian Bailly, Sophie Demoustier, Jacques Devaux, Pierre Godard, Alain Jonas, Roger Legras (coord.), Bernard Nysten
<u>MAPR2481</u>	Deformation and fracture of materials[37.5h+30h] (6 credits) (in French)	Thomas Pardoën
<u>MAPR2700</u>	Introduction to ceramics[22.5h+15h] (3 credits) (in French)	Francis Delannay

Second quadrimester

<u>FSA2240</u>	Gestion financière et comptable[30h+15h] (4 credits) (in French)	Philippe Grégoire
<u>ELEC2754</u>	Electronics : advanced topics[15h+22.5h] (3 credits) (in French)	Hervé Buyse, Francis Labrique

MATR 23 Third year

The third year programme comprises between 58 and 64 credits, with a minimum of 120 credits for the whole of the two years MATR 22 and MATR 23, including the options and the end of course thesis (30 credits). It is allowed, subject to the agreement of the study advisor and the MATR Committee, to inverse the general and polyvalent studies from MATR 22 to MATR 23 or vice-versa.

First quadrimester

<u>FSA2140</u>	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
<u>FSA2300</u>	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
<u>MAPR2800</u>	Materials Science Seminar[30h] (2 credits) (in French)	Patrick Bertrand

Second quadrimester

<u>MAPR2800</u>	Materials Science Seminar[30h] (2 credits) (in French)	Patrick Bertrand
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Evaluation

The courses and practical work are evaluated in line with the existing rules and regulations of the Faculty of Applied Sciences. Rules specific to the speciality (evaluation of the apprenticeship, presentation and evaluation of the end of course thesis), are available via the MATR Committee.

Positioning of the degree within the University cursus

Holders of this degree have a wide opening into a "minor" course in another speciality. Reciprocally, a "minor course" in Materials Science is also accessible to students from other specialities. The degree in Civil Engineering, Materials Science, entitles access to numerous 3rd cycle (masters) programmes and to the PhD programme in Applied Sciences.