

## Faculty of Applied Sciences



INCH2

**Ingénieur civil chimiste (Diploma of the Second Cycle (Ingénieur civil) in Chemical Engineering)**



### Programme management

MAPR Département des sciences des matériaux et des procédés

**Responsable académique :** Denis Dochain

**Contact :** Denis Dochain

Tél. 010472378

dochain@auto.ucl.ac.be

### Study objectives

The study objective of the BSc Hons programme in Chemical Engineering is to provide the student with a real polyvalent training course. Not only does the programme help the student solve problems inherent to chemical reactions, but it also goes into other engineering domains thanks to the solid knowledge it gives in fundamental sciences, in mathematics and in Applied Sciences. The student's scientific analytical capacities will be developed partly through the study of the phenomena of transferring matter and heat, chemical thermodynamics and kinetics, and reactionary calculations. His spirit of synthesis will be called on through having to organise the different facets of a given engineering problem to arrive at a coherent whole, namely a process.

### Admission conditions

The programme leading to the degree in Civil Chemical Engineering 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 speciality study programme comprises 180 credits of lectures, practical work and laboratory work, of which a quarter is covered by optional courses. The timetable volume dedicated to the practical work and the laboratory work counts for over 40% of the total timetable volume. The training provided via the compulsory courses comprises two main cores : a central core covering the four basic subjects of chemical engineering : (thermodynamics and chemical kinetics, transfer of mass and energy, unitarian operations and processes, applied mathematics, automatics, optimisation, simulation) and a core course which opens up the studies of the civil chemical engineers to the key subjects of chemical engineering today (biology, materials and polymers, the environment, economics and management and energetics).

### Programme content

#### 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>	Foundations of financial management[30h+15h] (4 credits) (in French)	Philippe Grégoire

##### Polyvalent courses :

<u>INMA2701</u>	A préciser (in French)	
<u>INMA2702</u>	A préciser (in French)	
<u>MAPR2300</u>	Process Control[30h+37.5h] (5 credits) (in French)	Georges Bastin, Denis Dochain
<u>ELEC2751</u>	A préciser (in French)	

<u>FSA2220</u>	Introduction to life science[60h] (6 credits) (in French)	Spyridon Agathos, Georges Bastin, Jean Lebacq, Philippe Lefèvre (coord.), Vincent Legat, Yves-Jacques Schneider
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*The students will follow parts "A" and "C", for [45 hours] (4.5 credits)*

MAPR2805 A préciser (in French)

MECA2855 A préciser (in French)

MECA2901 A préciser (in French)

### Specialised studies

#### Complete modules

40.01. Chemical Engineering I : Separation and reactions

40.02. Chemical Engineering II : Thermodynamics - Kinetics

40.03. Applied Chemistry

40.04. Protection of the environment and preventative techniques

#### Shortened module

30.01. Polymers

50.01 Liquid and transfer mechanics

<u>MAPR2370</u>	Corrosion & protection of metals[22.5h] (2 credits) (in French)	Joris Proost
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<u>BIR1312</u>	Introduction to analytical chemistry[30h] (2.5 credits) (in French)	Joseph Dufey, Yves Dufrêne, Yves Dufrêne
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### Options

*The student will select a group of optional courses so as to attain a compulsory volume of 152 hours of course attendance (lectures, practical exercises and seminars) over the duration of the three years.*

*From the non-material course options, the following are recommended :*

*- the course subjects 30.03 and 30.04, for students wishing to complete their studies in materials*

*- courses such as the following, for students wishing to complete their studies in automatics, statistics, quality control, production or simulation :*

<u>INMA2491</u>	Operations research for production and logistics[30h+22.5h] (5 credits) (in French)	Yves Pochet, Laurence Wolsey
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<u>MECA2671</u>	Automatic : Theory and implementation[30h+45h] (6 credits) (in French)	Michel Gevers, Vincent Wertz, Vincent Wertz (supplée Michel Gevers)
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<u>STAT2510</u>	Statistical quality control.[15h] (2.5 credits) (in French)	Bernadette Govaerts
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<u>STAT2520</u>	Design of experiment.[22.5h+7.5h] (3 credits) (in French)	Bernadette Govaerts, Éric Le Boulengé
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<u>INMA2370</u>	Modelling and analysis of dynamical systems[30h+30h] (5 credits) (in French)	Georges Bastin, Vincent Wertz, Vincent Wertz (supplée Georges Bastin)
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<u>ELEC2875</u>	SYSTEM IDENTIFICATION[30h+30h] (5 credits) (in French)	Michel Gevers
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<u>MECA2120</u>	Introduction to finite element methods.[30h+30h] (5 credits) (in French)	Vincent Legat
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*- the courses offered in the liquid mechanics and thermodynamics and thermology groups, from the list of the FSA programme subjects, for students wishing to complete their studies in transfers and energetics.*

*- the following courses, for students wishing to perfect their studies in Applied Chemistry and the Environment :*

<u>MAPR2320</u>	Process development in industrial organic chemistry[30h+15h] (4 credits) (in French)	Christian Bailly, Fernand Thyron
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<u>MAPR2430</u>	Inorganic industrial chemical processes[30h+15h] (4 credits) (in French)	Juray De Wilde
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<u>MAPR2690</u>	Valorisation and Treatment of Solid Wastes[30h+7.5h] (4 credits) (in English)	Jacques Devaux, Joris Proost
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<u>BIR1319</u>	Colloïdal and surface chemistry[30h] (2.5 credits) (in French)	Christine Dupont, Paul Rouxhet
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<u>POLU2150</u>	A préciser (in French)	
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<u>BIR1323</u>	Microbiology[30h+15h] (3.5 credits) (in French)	Jacques Mahillon
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### Language courses

*During the second cycle, the students may follow various language courses, organised by the ILV. These courses represent a minimum of 30 hours (3 credits) of the total volume of the optional part of their programme.*

*A specific course aimed at improving the linguistic skills and professional interactive communication capacities of the students, is especially organised for the FSA students.*

<u>ANGL2470</u>	English communication skills for engineers[30h] (3 credits)	Ahmed Adriouèche, Henri November, Severine Schmit
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**Apprenticeship**

The students must carry out an apprenticeship in a firm of at least three weeks duration between the last two technical years (INCH22 and INCH23). This apprenticeship is worth 3 credits (30 hours) of the total volume of their programme. It is subject to the prior approval of the apprenticeship supervisor and the programme management committee and must conclude with a report. It will be ratified evaluation specifying " has/has not satisfied the requirements".

Visits to industrial process will be organised by the programme management committee. The students must carry out 5 visits outside of those organised in the context of their course.

**End of course project**

This project, carried out in the third year, represents a volume of work equivalent to one quadrimester and is worth 25 credits.

**Programme per year of studies**

Before embarking on his study programme year by year, the student will choose a study advisor, in line with the rules established by the PRCD degree Committee. Together with the agreement of the advisor, he will determine the subjects that he will take in the form of a complete or shortened module, in line with the reglementation for the Civil Chemical Engineering degree programme.

**The programmes listed below, only present the compulsory courses** (those courses not featuring in the complete modules ). In addition to the compulsory courses, the student will complete his programme by means of options in line with the programme and in agreement with the academic supervisor.

**INCH 21 First year***First quadrimester*

<u>MECA2855</u>	A préciser (in French)	
<u>INMA2701</u>	A préciser (in French)	
<u>FSA2220</u>	Introduction to life science[60h] (6 credits) (in French)	Spyridon Agathos, Georges Bastin, Jean Lebacq, Philippe Lefèvre (coord.), Vincent Legat, Yves-Jacques Schneider

The students will follow parts "A" and "C", for [45 hours] (4.5 credits)

<u>MAPR2805</u>	A préciser (in French)	
<u>MECA2901</u>	A préciser (in French)	
<u>MAPR2140</u>	Supplements in inorganic chemistry[30h+30h] (5 credits) (in French)	Joris Proost
<u>MAPR2310</u>	A préciser (in French)	
<u>BIR1312</u>	Introduction to analytical chemistry[30h] (2.5 credits) (in French)	Joseph Dufey, Yves Dufrêne, Yves Dufrêne

*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)	Jacques Devaux, Pierre Godard
<u>MAPR2400</u>	A préciser (in French)	
<u>MAPR2473</u>	A préciser (in French)	
<i>The students will follow part "A" for [ 3 hours + 15 hours ]</i>		
<u>MECA2321</u>	A préciser (in French)	

**INCH 22 Second year***First quadrimester*

<u>FSA2300</u>	Religious Science Questions[15h] (2 credits) (in French)	Bernard Van Meenen
<i>courses to follow in INCH 22 or INCH 23</i>		
<u>ELEC2751</u>	A préciser (in French)	
<u>INMA2702</u>	A préciser (in French)	
<u>MAPR2118</u>	Fluid-fluid separations[30h+30h] (5 credits) (in French)	Denis Mignon
<u>MAPR2330</u>	Reactor Design[30h+30h] (5 credits) (in French)	Denis Dochain
<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.), Roger Legras (supplée Alain Jonas), Bernard Nysten
<u>MECA2322</u>	Fluid mechanics and transfer II.[30h+30h] (5 credits) (in French)	François Dupret, Grégoire Winckelmans

*Second quadrimester*

<u>FSA2240</u>	Foundations of financial management[30h+15h] (4 credits)	Philippe Grégoire
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	(in French)	
<u>MAPR2141</u>	Physical chemistry of hydrometallurgical processes[30h+30h] (5 credits) (in French)	Joris Proost
<u>MAPR2145</u>	Process Simulation[30h+15h] (4 credits) (in French)	Denis Dochain, Fernand Thyrion
<u>MAPR2300</u>	Process Control[30h+37.5h] (5 credits) (in French)	Georges Bastin, Denis Dochain
<u>MAPR2370</u>	Corrosion & protection of metals[22.5h] (2 credits) (in French)	Joris Proost
<u>MAPR2380</u>	Solid-fluid separation[30h+30h] (5 credits) (in French)	Pierre Adam, Denis Mignon

## INCH 23 Third year

### *First quadrimester*

<u>FSA2140</u>	Eléments de droit industriel[22.5h] (2 credits) (in French)	Gilbert Demez
<u>MAPR2643</u>	Treatment of liquid effluents[30h+7.5h] (4 credits) (in English)	Spyridon Agathos, Léon Duvivier
<u>MAPR2680</u>	Treatments of gaseous wastes[30h+7.5h] (4 credits) (in English)	Jacques Devaux, Olivier Françoisse

### **Options**

- a course on Religious Sciences will be followed in 22 or 23 ;

- courses to be taken from among those offered by the University, especially :

<u>INMA2370</u>	Modelling and analysis of dynamical systems[30h+30h] (5 credits) (in French)	Georges Bastin, Vincent Wertz, Vincent Wertz (supplée Georges Bastin)
<u>MAPR2320</u>	Process development in industrial organic chemistry[30h+15h] (4 credits) (in French)	Christian Bailly, Fernand Thyrion
<u>INMA2491</u>	Operations research for production and logistics[30h+22.5h] (5 credits) (in French)	Yves Pochet, Laurence Wolsey
<u>MECA2671</u>	Automatic : Theory and implementation[30h+45h] (6 credits) (in French)	Michel Gevers, Vincent Wertz, Vincent Wertz (supplée Michel Gevers)
<u>STAT2510</u>	Statistical quality control.[15h] (2.5 credits) (in French)	Bernadette Govaerts
<u>STAT2520</u>	Design of experiment.[22.5h+7.5h] (3 credits) (in French)	Bernadette Govaerts, Éric Le Boulengé
<u>ELEC2875</u>	SYSTEM IDENTIFICATION[30h+30h] (5 credits) (in French)	Michel Gevers
<u>MAPR2320</u>	Process development in industrial organic chemistry[30h+15h] (4 credits) (in French)	Christian Bailly, Fernand Thyrion
<u>MAPR2430</u>	Inorganic industrial chemical processes[30h+15h] (4 credits) (in French)	Juray De Wilde
<u>MAPR2690</u>	Valorisation and Treatment of Solid Wastes[30h+7.5h] (4 credits) (in English)	Jacques Devaux, Joris Proost
<u>BIR1323</u>	Microbiology[30h+15h] (3.5 credits) (in French)	Jacques Mahillon
<u>BIR1319</u>	Colloïdal and surface chemistry[30h] (2.5 credits) (in French)	Christine Dupont, Paul Rouxhet
<u>POLU2150</u>	A préciser (in French)	