



**Organisation of the Department  
Electrical Engineering - ESAT**

# 1 The Department of Electrical Engineering - ESAT

## 1.1 Origin

The Katholieke Universiteit Leuven (K.U.Leuven) was founded in 1425. The origin of the Electrical Engineering Department of the Faculty of Engineering goes back to the "Chair of Electricity" at the "Special School" (for engineering) of the Faculty of Sciences of this university. This chair was founded in 1900. It grouped all the research and educational activities in the field of Electrical Engineering at the university. Therefore, in 2000, the centennial anniversary of Electrical Engineering in Leuven was celebrated.

In 1961 the School of Engineering was separated from the Faculty of Sciences to constitute an own Faculty of Applied Sciences (Engineering). Not much later, in 1964, the educational structure was split up in a French and a Flemish one. In 1968, the French programme was transferred to the city of Louvain-la-Neuve. The Flemish programme remained in the city of Leuven.

## 1.2 Organisation

Shortly after 1968, the university in Leuven was reorganised. The departments became as well responsible for the organisation of the education as for the coordination of the research activities of the individual laboratories.

The actual Chairman of the Department Electrical Engineering - ESAT is Prof. R. Belmans. The department has a number of committees and councils that manage the different tasks of the department. Up-to-date information is available on the internet (<http://www.esat.kuleuven.ac.be/>).

The Permanent Committee on Education gives advice on all problems related to educational matters. The current chairman of this Committee is Prof. M. Steyaert.

For information about the department, please contact Mrs. Lut Vanderbracht, ESAT, Katholieke Universiteit Leuven, Kasteelpark Arenberg 10, 3001 Leuven-Heverlee, Belgium. Tel : +32-16-321130. Fax : +32-16-321986. E-mail : [info@esat.kuleuven.ac.be](mailto:info@esat.kuleuven.ac.be). Web : <http://www.esat.kuleuven.ac.be/>.

## 1.3 Research

The research activities of the department are organised by its five research divisions, to which all members of the academic and scientific staff are assigned. Moreover, a departmental service centre is set up to provide logistic services to all members of the department and in some cases to other members of the university.

The five research divisions are :

1. ESAT-ELECTA, *Electrical Energy and Computer Architectures*  
 Chaired by R. Belmans  
 Permanent academic staff: G. Deconinck, K. Hameyer, M. Machiels,  
 D. Van Dommelen.
  
2. ESAT-MICAS, *Micro-electronics and Sensors*  
 Chaired by W. Sansen  
 Permanent academic staff: W. Dehaene, G. Gielen, R. Puers, M. Steyaert
  
3. ESAT-PSI, *Center for Processing of Speech and Images*  
 Chaired by P. Suetens  
 Permanent academic staff: D. Van Compernelle, D. Vandermeulen, L. Van  
 Eycken, L. Van Gool, H. Van hamme, P. Wambacq
  
4. ESAT-SCD, *Signals, Identification, System Theory and Automation /  
 Computer Security and Industrial Cryptography / Document Architectures*  
 Chaired by J. Vandewalle  
 Permanent academic staff: A. Barbé, B. De Moor, J. Engelen, M. Moonen,  
 B. Preneel, J. Suykens, S. Van Huffel, I. Verbauwhede
  
5. ESAT-TELEMIC, *Telecommunication and Microwaves*  
 Chaired by B. Nauwelaers  
 Permanent academic staff: A. Van de Capelle, G. Vandenbosch, E. Van Lil

## 1.4 Education

The Department of Electrical Engineering - ESAT is the largest one of the Faculty of Engineering. It provides education to about 40 % of all engineering students in the university. About 80 students graduate each year at the MSc level and about 12 at the PhD level.

The educational tasks are taken up by a group of about 30 full-time professors, 15 part-time professors and more than 200 research assistants, the majority of which are supported by external research programs and projects. A group of about 50 technicians and administrative aids assist them in their tasks.

The teaching staff are members of the above five research divisions of the department or of the associated division ESAT-INSYS, which groups all educational activities and teaching services that are offered by IMEC staff to our university. This division is chaired by R. Mertens. Permanent academic staff members are H. De Man and K. Maex. Part-time members include G. Declercq, R. Lauwereins, F. Catthoor, L. Claesen, C. Claeys, R. De Keersmaecker, C. De Meyer, M. Engels, G. Groeseneken, P. Heremans, H. Maes, J. Nijs, C. Van Hoof, W. Vandervorst. Members of ESAT-INSYS are engaged in research at the Inter

University Micro-electronic Center, IMEC vzw, Kapeldreef 75, 3001 Leuven-Heverlee.

The MSc degree is normally obtained after five years of study. The first two years are called the "candidature". They provide thorough education in basic sciences such as mathematics, physics, chemistry etc. The three subsequent years gradually allow more specialisation in electrical engineering. They lead to seven final study options : microelectronics, data and automation, multimedia, telecommunications and telematics, power engineering, biomedical techniques and physics of electronics. In the fifth and last year, the students participate with their MSc thesis. (Note that this system will change when the Bachelor-Master structure is being introduced as of 2004).

More details about the courses are given on the internet or in a special brochure that is made annually by the department.

### **Socrates**

The department participates in the Socrates program of the European Union via Erasmus exchanges within European Credit Transfer (ECTS) agreements, Intensive Course programs, Curriculum Development projects and Thematic Networks. These initiatives create the opportunity for the students to study part of their curriculum at another European university, where the courses and the curriculum is equivalent to those taught at the K.U.Leuven. The exchanges could take place during the last two years of the engineering education, but emphasis is on the last year where students do a thesis project at another university.

On the other hand, the department also welcomes students from other universities to work on a thesis project in our laboratories or to follow selected courses out of the normal engineering curriculum or, when appropriate, from advanced programs.

The syllabi of the courses and also a list of available subject proposals for project work can be found on our internet site <http://www.esat.kuleuven.ac.be/>.

### **PhD Work**

After an MSc degree or equivalent, research work can be carried out in the several research divisions (see above), leading to a PhD degree. On the average this takes about four years. About 180 PhD students are currently working towards their degree.

### **Foreign students**

Students from outside Belgium can take up a program leading to an MSc thesis or a PhD degree. Before starting a PhD program, students who do not have a MSc degree from the K.U.Leuven or another Belgian university are required to follow a MSc program (1 year) or a predoctoral program (1 year). Basically, all research topics mentioned in this research report can be taken up as a PhD subject. Of

course, for either an MSc or a PhD thesis, a professor from the department has to act as thesis advisor.

Foreign students who are interested in obtaining a degree from this department are encouraged to contact first the International Centre (Trees Deloddere, Oude Markt 13, 3000 Leuven <http://www.kuleuven.ac.be/admin/sv/niv2/io-k00.htm>).

Single courses can be taken up as well. For example the European Erasmus program and ECTS is operational at this university. Whoever is interested, is asked to contact the Secretariat of the Faculty of Engineering, Kasteelpark Arenberg 1, B-3001 Leuven-Heverlee (tel. +32-16-321748, fax. +32-16-321983).

## **1.5 Logistic Service Center**

In addition to the co-ordination and/or organisation of research and education, the department provides a number of logistic services. The Electronic Component Shop and the Electronic Service Centre are accessible to the whole university community and are part of Campus Exact Sciences (Faculties of Engineering, Sciences and Bio-engineering).

### **1.5.1 Electronic Components Shop**

The maintained warehouse contains over 4300 different electronic components. A complete list is available on the internet at <http://www.esat.kuleuven.ac.be/cde/magelek/>.

### **1.5.2 Electronics Service Centre**

See detailed information at <http://www.esat.kuleuven.ac.be/cde/>.

The main activities and services are :

- a. Design and construction of equipment and subsystems: the purpose is to build equipment consistent with industrial standards, as far as housing, printed circuit and wiring are concerned.
- b. Automation projects, using LabVIEW, a software program that meets most of the needs of Data Acquisition and Instrument Control.
- c. Repair of test and measurement equipment, equipment from laboratories and PC-support : set-up, problem detection, interfacing and repair.
- d. Printed Circuit Board design: the design is carried out by means of CAD software. Hereto the workshop is using a program CADSTAR for Windows (incl. SMD and multilayer).

- e. Printed Circuit Board production : single- and double-sided printed circuit boards can be delivered within three days whereas printed circuits with through-plated holes are delivered within one week (LPKF CAD/CAM system).

The following facilities are available : photoplotting, SMD assembly, soldering and desoldering machines, documentation centre of semiconductor and component databooks.