



**European Curricula**

**in**

**Electrical and Information Engineering**

***J.M. Thiriet (CRAN & IUTNB - UHP Nancy I)***

***M. Robert (CRAN & ESSTIN - UHP Nancy 1)***

***G. Zissis (CPAT - U. Toulouse III)***

***Club EEA Commissions for teaching &  
International Relationships***

***THEIERE partners and EAEIE members***

***THANK YOU VERY MUCH TO THE PARTNERS***

Vigo, 2nd December 2001





# Our Objectives

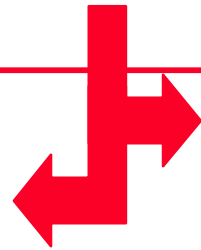


## Questions :



What are the equivalencies between Diplomas in Electrical Engineering in Europe ?

Does exist any equivalent "levels" ?



Complicated answer...



## A first solution :



Compare existing European Higher Education Schemes and try to identify Electrical Engineering Curricula...



# Synthesis



## **Various kinds of institution exist :**

- Classical universities, enabled to deliver the doctorate
- Technological universities and high school, "academic" as far as the approach is concerned (direct contact with research) but with a professional (industry) "finality", enabled to deliver the doctorate
- Technological schools (such as Fachhochschule) which students graduate at an intermediary level (4 years after secondary school). These schools are not enabled to deliver the doctorate.
- "Short technological" institutes, with professional purposes, with or without gateways towards other curricula (classical, or professional)



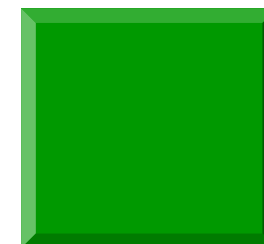
## Some preliminary statements



European Higher Education Schemes (HES)  
are very complex !

**Despite of Sorbonne and Bologna Conferences important discrepancies between European HES still exist...**

- No significant convergence in "Bachelor" level (second. +3 yrs)
- Relative good convergence in "Master" level (second. +5 yrs)
- Absence of normalisation for "PhD" duration (second. +8 yrs)



### Some solutions:

- More and more mutual agreements between institutions appear (equivalencies, common diplomas...)
- ECTS system is rather generalised in many European countries (enhanced student mobility)
- Re-modelling of HES on the way in some countries (Italia, France within the 4-year state-university agreements?)
  - "soft" vision of 3-5-8 (European certificate + national diploma) => France until now
  - "intermediate" vision (new curricula, parallel with national diploma curricula) => Deutschland
  - "hard" vision (complete reorganisation) => Italia



## Actual implementation of 3-5-8 (1)



- **Countries presently using 358 (replaces previous curricula and diploma)**
  - Italia, the new scheme is compulsory (Laurea (3)-Laurea specialista (5)-dottorato di ricerca (8)), presently organised in almost all the universities, at least in our fields.
- **Countries in where 358 is not implemented yet but with some strong political incitement**
  - Deutschland (in the federal schemes since 1998, parallel to the traditional diploma "diplom-ingenieur"... ) but the complete switch towards 358 seems impossible (the "Bundesrat" would not be in favour for the moment) ; in some Länder, the incitement to switch to the 358 is stronger than in others. Some universities proposes "bachelor" and "master" curricula, in addition to traditional curricula. Some "masters" are proposed in English language, mainly for foreign students.
  - Norge/Noreg :proposition of a 358 scheme as an alternative to the existing system
  - Countries which are ready, as far as the legislation is concerned (Deutschland, Österreich, Suomi/Finland, Hungary/Magyarország, Italia, Slovensko, Cesko)
  - France: the universities which are presently preparing their new 4-year agreement with the state (French republic)



## Actual implementation of 3-5-8 (2)



- **Countries which are reflecting about**
  - België/Belgique : the present system (2(candidat), 5(engineer) would be replaced by a new scheme bachelor(3) then master (5) in classical universities in 2002-2003. A problem is posed concerning the "technological schools" ("hogescholen" in Vlaanderen (Dutch speaking part of België), "ingénieur industriel" in Wallonie (French-speaking part of Belgique)). The ministries are not fair to switch the present system (4 years after the secondary school) to 5 years (costs ?)
  - Eesti (presently 4-6-10) will switch to 3-5-9 in 2002.
  - Éire/Ireland (4-5-8) (4 year-bachelor without studies fees => then industry; the master (5) needs to be paid by the students, not free)
  - Portugal (new "licenciatura com mestrado integrado" is a new master)
  - Slovensko
  - Cesko (new system in 2003 ?)
- **Countries which observes (or which seem less concerned)**
  - Bulgaria/???????? (which has implemented recently 4-5-8)
  - España (some discussions, either 3-5 or 4-5.5...)
  - Suomi/Finland, Greece/????? (University is 4 years, polytechnical school is 5 years), Lietuva (4-6-9), Polska (3.5-5-9), Ukraine/??????? (4-5-8)
  - United Kingdom (nothing for the moment ???)



## Actual implementation of 3-5-8 (3)



- **Recognition of diploma by industry**

- Deutschland => discussion on the recognition of bachelor
- Discussions in Ireland with professional organisations, which are themselves in relation with professional bodies in Europe
- Italia : participation of the professional bodies to the discussion on the reorganisation ?
- Keeping of the difference between classical universities and high schools (Italia, France ...)

- **National recognition of diploma**

- French question? (Deutschland => Länder)

## Diplôme Universitaire de Technologie

(Technology academic diploma) => 2 years after secondary school

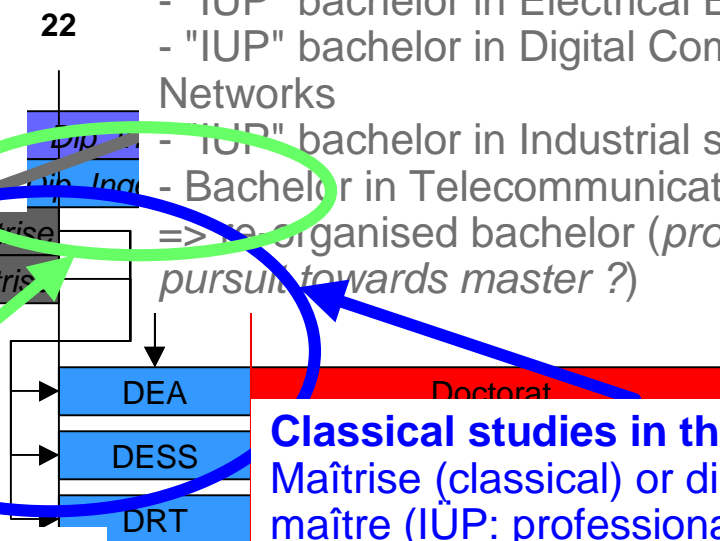
- Electrical engineering and industrial computing (more than 30 universities in France, national programme, about 100 diploma per year per department)
- Telecommunication and network engineering (22 universities in France, national programme, about 100 diploma per year per department)
- Computer (data to check)

=> mainly professional life, "professional bachelor"?

Universités	DEUG	Uni. Licence	Un. Maîtrise
Uni. IUT STS	IUP	IUP Licence	IUP Maîtrise
IUT	DUT	Un. IUT STS	
STS Lycées	BTS		
Universités	DEUST	Licence Prof.	

**Diplômes d'Ingénieurs (engineer school)**  
 Several schools, several schemes, some networks (about 100 engineer schools in France connected with EIE)  
 => Master replacing diploma?

- Example:** Licence (classical university and IUP, professional academic institute)
- System:**
- Bachelor in Electronics, Power systems and Automatic control (more than 1000 diploma/year)
  - Bachelor in Electrical Engineering (ab. 400 diploma per year)
  - Bachelor in Computer
  - Bachelor in Production engineering
  - "IUP" bachelor in Electrical Engineering
  - "IUP" bachelor in Digital Communication Networks
  - "IUP" bachelor in Industrial systems engineering
  - Bachelor in Telecommunications
- => re-organised bachelor (professional and/or to pursue towards master?)



: Diplôme  
 S : Diplôm  
 : Diplôme

**Classical studies in the University :**  
 Maîtrise (classical) or diplôme d'ingénieur-maître (IUP: professional academic institute)  
 + DEA (Diplôme d'Etudes Approfondies : increased study diploma) => "Research-dedicated master" ?  
 + DESS (Diplôme d'Etudes Supérieures Spécialisées) => "Professional-oriented master" ?



## Aims



- **Mobility of students**

- Example: Bachelor in Automatic Control (1 year in Ulm, 1 year in Sofia, 1 year in Rennes, let's suppose there is no linguistic problem....)...
- Master in Telecommunications (1 year in Vigo, 1 year and a half in Oulu, 2 years in Lisboa, 1 semester in Praha, let's suppose again there is no linguistic problem....)...

- **Mobility of ex-students**

- A bachelor in Automatic control by Antwerpen is recognised in Polska as if it was delivered inside the country...
- A master in Power systems delivered by Lappenranta is recognised in Portugal as if it was delivered inside the country...



## Example: in France work achieved with Club EEA



- Avoid that each university implements its own format
- Reflection within the "Teaching" and the "International relationships" Commissions on the implementation
- To keep at least the national frame for the recognition of the diploma
- Discussion with professional bodies ?
- Contents of the bachelor and master (in our disciplines, but also other important aspects, pre-requisites, mathematic skills, languages, Behavioural skills...)





# Works to achieve (1/3)

Is it possible to make some propositions for the implementation of 358 in EIE in Europe ?



## AIM

- Avoid that each university implements its own format
- Think on the best (or at least the "least worst") way to implement it, with a European view (student mobility, recognition of diploma)
- What is the interest to keep some curricula/diploma outside the 358 scheme?
- Follow the reflection done during INEIT-MUCON ("the minimum as an engineer has to know")
  - emerging disciplines
  - new pedagogy
  - indispensable fundamentals
  - evaluation methods
- What means EIE in the various countries (curricula in EIE, curricula in which EIE is a part)



## **Works to achieve (2/3)**

**Is it possible to make some propositions for the implementation of 358 in EIE in Europe ?**



### **ANALYSIS**

**JUNE 2002**

- **Per country, list of universities in which there is "Electrical and Information Engineering"**
- **Kind of curriculum, number of students (idea : to show what is the "weight" of EIE in Europe)**
- **Contents of these curricula (are there some programmes defined at the national, or regional, levels by some commissions, if yes, what are the present state of the reflection about 358?)**
- **Relationships with organisations at the national levels (to have in which country a working group to help in the work, as it is done with Club EEA for instance)**
- **Relationships with other broader European organisations (EAIE European Association for International Education?, French-Dutch Universities Network...)**





## Works to achieve (3/3)

Is it possible to make some propositions for the implementation of 358 in EIE in Europe ?



### SYNTHESIS

**FEBRUARY 2003**

- Try to find some "common" curricula
- Propose a scheme for some bachelors (3 years) in our specialities (computer, electronics, automatic control...)
- Propose a scheme for some masters (5 years) in our speciality
- Helpful for colleagues who wants to organise new studies with a European view...

**PUBLICATION OF THE REPORT,  
JUNE 2003**



# EAEEIE 2002 York



- Round table (some participants : ???)



**Let's discuss now !!!**



- **Interesting or not?**
- **Do we have enough energy and motivation to achieve it?**
- **Groups of persons per country who accept to work (connections with national associations, national professional bodies)**
- **Groups of persons who accept to work on connections with other European associations (EAIE, other association or European professional bodies ?)**