EngIQ - Doctoral Program in Refining, Petrochemical and Chemical Engineering

A PhD PROGRAM IN AN INDUSTRIAL SETTING

Sebastião Feyo de Azevedo
Professor catedrático, Diretor da Faculdade de Engenharia da Universidade do Porto
diretor@fe.up.pt
BIN@Brazil,
Ribeirão Preto, 13 de novembro de 2013

To say what I am going to say...

1. Programme Overview
2. Main features
3. Universities, teaching staff, R&D units and companies
4. Programme details
   3. Course structure, some figures, a seal of quality
5. Examples of ongoing PhD projects
6. Final notes - Challenges

BIN@Brazil, Ribeirão Preto, November 13, 2013  http://www.engiq.pt/
# Doctoral Program in Refining, Petrochemical and Chemical Engineering

## I - Overview

**The Doctoral Program in Refining, Petrochemical and Chemical Engineering** is the result of a unique cooperation in Portugal, mainly for its dimension and structure, between:

1. The 5 major universities with education and research programmes in the areas of refining, petrochemical and chemical engineering;

2. 5 top companies in the sectors of refining, petrochemical and chemical industries;

3. A cluster formally set in 2009, known as the **Petrochemical, Chemical and Refining Industry Association** (with the acronym AIPQR), through which 20 other companies may participate

---

**Part of an important wide programme, including:**

1. Cooperation in operator training programmes

2. Cooperation as partners in European R&D projects

3. The PhD programme itself

4. Longlife learning at advanced level - making use of the modules that compose the curriculum part of the PhD programme.
Doctoral Program in Refining, Petrochemical and Chemical Engineering

II - Main features

- The training takes a minimum of 3 years, with an effort of 60 Credits ECTS (European Credit Accumulation and Transfer System) per academic year;
- The training focuses on autonomous scientific research proposed by the companies to be developed by candidates, properly framed and accompanied by supervisors of both the university and industrial partners;
- The curriculum part is provided with flexibility as regards the selection of curricular units to attend, in order to meet:
  - the need and interest of the student, covering potential training gaps, having in mind the topic of the thesis.

III - Universities, teaching staff, R&D units and companies - I

- Universities
  - University of Porto (FEUP-UP)
  - University of Aveiro (UA)
  - University of Coimbra (FCT-UC)
  - New University of Lisbon (FCT-UNL)
  - University of Lisbon (IST-UTL)

- Companies
  - Galp Energia
  - CUF - Químicos industriais
  - Euroresinas
  - Cires
  - Sociedade Portuguesa de Ar Líquido
  - 20 other companies associated in AIPQR
Doctoral Program in Refining, Petrochemical and Chemical Engineering

III - Universities, teaching staff, R&D units and companies - II

Teaching Staff and Supervisors
- Faculty, all working in top R&D Research Units recognised by FCT (Portuguese Foundation for Science and Technology)
- Portuguese experts
- Foreign experts

R&D units
- 11 major R&D Units from the different partner universities
  - FEUP-UPorto: LSRE, LEPAE, CEFT
  - UAveiro: CICECO, DQ
  - FCT-UCoimbra: CIEPQPF
  - FCT-UNLisboa: REQUIMTE
  - IST-ULisboa: CQE, CPQ, ICEMS, IBB

Doctoral Program in Refining, Petrochemical and Chemical Engineering

IV - Programme details - Course structure and some figures

- 162 work hours per course unit (6 credits fo the European credit system)
  - 40 hours of contact+ 40 hours of tutorials + individual work

- Lectures on fridays (16:00-20:00) and saturdays (9:00-13:00)

- Lectures in different locations, supported by videoconference

- Some figures from 2009 and 2012 – 4 editions
  - 21 PhD students (2 concluded, 4 about to conclude)
  - 42 students with a diploma of Advanced Studies (human resources of the companies)
  - 10 students performed single course units
A seal of quality:

- In 2012 the Portuguese Foundation for Science and Technology (FCT) launched a programme to finance competitive PhD Programmes with one of three possible profiles:
  - National academic cooperation
  - With international cooperation
  - With industrial participation

- EngIQ was 1 of the 58 programmes selected, out of 252 applications, and the only industry-based programme

Galp Energia

- Solid catalysts for alkylation of isobutane and mixtures of butylenes
  - **Supervisors:** José Luís Figueiredo (FEUP-UP), Isabel Fonseca (FCT-UNL)
  - **Coordinator Galp Energia:** Engº José Inverso

- Extraction of mercaptans from ‘jet-fuel’ streams through ionic liquids
  - **Supervisors:** João Coutinho (UA), João Crespo (FCT-UNL)
  - **Coordinator Galp Energia:** Engº Fernando Lopes Morgado

- Optimization of the Parex Units in GALP Refinery
  - **Supervisors:** Alírio Rodrigues (FEUP-UP), José Paulo Mota (FCT-UNL)
  - **Coordinator Galp Energia:** Engª Rita Santos
### CUF-QI

- **Intensification in aniline production**
  - **Supervisors:** Clemente Pedro Nunes (IST-UTL), Filipe Freire (IST-UTL), Nuno Oliveira (FCT-UC)
  - **Coordinator CUF-QI:** Dr. Paulo Araújo

- **Micromixing in aromatics production**
  - **Supervisors:** Cristina Gaudêncio (FCT-UC)
  - **Coordinator CUF-QI:** Dr.ª Dulce Silva

- **A study on the electrolysis of sodium chloride employing the cell membrane process**
  - **Supervisors:** Adélio Mendes (FEUP-UP), Christopher Brett (FCT-UC)
  - **Coordinator CUF-QI:** Dr. Paulo Araújo

### EURORESINAS

- **Optimizing productivity of the resins plant**
  - **Supervisors:** Nuno Oliveira (FCT-UC), Henriques Matos (IST-UTL)
  - **Coordinator EURORESINAS:** Engº Ricardo Alvim

### FIMA

- **Optimization of the utilities in industrial plants in order to increase industrial eco-efficiency**
  - **Supervisors:** Henriques Matos (IST-UTL), Fernando Martins (FEUP-UP)
  - **Coordinator FIMA:** Engº António Leal de Oliveira
Challenges for the programme

- Capacity to generate and manage diversity of educational offer that serves the interests of industry and science
  - Effective capacity to promote R&D&I in industry
- Ability to promote quality training with the required outputs – good patents, good papers...
- Sustainability – keep high the interest of the industry

Challenges for the Director of Studies

- Keep a balance in the contribution of the different academic institutions – in the offer of modules and in supervision
  - Keep institutions happy!!!
- Solve the complex issue of IP - Intellectual Property

AND... Open the programme to other publics

Many thanks for your attention and

I leave with a short film about FEUP and EngIQ!