

**TU/e**

Technische Universiteit Eindhoven

Department Electrical Engineering

## Post-Master Technological Designer Programme Information and Communication Technology

General information

(Update: March 16<sup>th</sup>, 2009)

Have you (nearly) completed your MSc study in Electrical Engineering, Embedded Systems, Broadband Telecommunication Technology (a.o.), but do you still feel there is something missing?

Are you ready to apply your academic knowledge in challenging industrial design-oriented product-related projects ?

TU/e is offering top-students from top-universities the opportunity to obtain a Post-Master's Technological Designer Degree (Professional Doctorate in Engineering = PDEng) in close cooperation with industry.

One of the two-year full-time post-Master's programs is Information and Communication Technology (ICT), an integrated part of the TU/e Department of Electrical Engineering.

### **Goal of the Post-Master Designer Program on ICT:**

To provide the skills to specify, design, build, test and evaluate complex multi-disciplinary systems in the area of three important societal themes:

- Care and Cure
- The Connected World
- Smart and Sustainable Society.

### **Why should you choose for a two-year full time post-master's study ?**

In your M.Sc program you have gained basic theoretical knowledge. However, your practical experience in design may be limited.

Industry needs graduated engineers, who are capable of working in the multi-disciplinary world of designing and who are aware of the latest design methods. This requires technical creativity and knowledge in a variety of expertise fields, cost awareness, written and verbal presentation skills, in brief: Professional Development.

The course program of the ICT-program, individually tuned for each of the candidates, extensively pays attention to the above and also offers you the possibility to put your knowledge into practice through a challenging design project in collaboration with industry.

## **An excellent start for your international industrial top-career.**

### **What is the added-value of a Technological Designer for industry ?**

The Technological Designer creatively fills the gap between market demand and technical possibilities. In-depth understanding of the needs and wishes of users has first priority. A designer makes choices, searches for alternatives and makes decisions, where not only logic and expertise but also creativity, intuition and good taste are very important.

The decisions that are taken in the design phase have a great influence on the final product or process. They determine the major part of the production cost.

The step from design to application is crucial for the innovative and competitive capabilities of a company and presents a real challenge to the creative Technological Designer.

During the program the Technological Designer is being trained in detail in the latest design methods and how to apply these.

Being able to synthesize, to work in multi-disciplinary teams and to use well-developed personal skills, the Technological Designer knows how to approach and to solve a problem and is therefore a very efficient employee for industry.

### **What is the added-value for the technological Designer him-/herself ?**

During the two years of training, the candidate is a TU/e staff member and receives a salary in accordance with governmental regulations; no tuition fees have to be paid.

Design projects in collaboration with industry are an essential part of the training program.

### **Essentials:**

Our TU/e Designer Program on Information and Communication Technology pays a lot of attention to all elements needed for the design, realization and evaluation of an industrial product:

- Design methodology
- Application of modern design methods and tools
- Interdisciplinary work in teams
- Technical creativity
- Project Based Management, including:
  - Managerial decision documents
  - Working with deadlines and milestones
  - Cost awareness
- Quality awareness
- Design for manufacturability, reliability, maintainability, and etc.
- Technical writing and presentation skills

### **3TU. School for Technological Design - Post-Master Technological Designer Programs:**

Upon request of high-tech Dutch industry a number of 2-year Post-Master Technological Designer Programs were established more than 20 years ago. High-tech companies need professionals who can design and develop complex new products and processes and offer innovative solutions. All programmes work closely together with national industry and knowledge centres like TNO, offering the trainees the opportunity to participate in large-scale, interdisciplinary design projects under industrial circumstances. In addition candidates' technological expertise is broadened and deepened; she/he is also trained in professional skills.

The idea was and still is supported by the Ministry of Education and the Ministry of Economic Affairs.

The three leading universities of technology in the Netherlands - Delft University of Technology, Eindhoven University of Technology and the University of Twente - have joined forces in the 3TU.Federation ([http://www.3tu.nl/en/about\\_3tu/](http://www.3tu.nl/en/about_3tu/)). This federation maximizes innovation by combining and concentrating the strengths of all three universities in research, education and knowledge transfer.

The 3TU. School for Technological Design - Stan Ackermans Institute - has 11 two-year full-time programmes, leading to a Professional Doctorate in Engineering (PDEng). All programmes (<http://www.3tu.nl/en/education/sai/>) offer the opportunity to broaden your knowledge and experience by means of a personal and practical design assignment, under the supervision of experienced design professionals.

For the duration of the programme (maximum of two years) PDEng candidates will be appointed as a member of the scientific staff of the TU/e, TU Delft or the University of Twente respectively. They receive a salary and do not pay tuition fees.

Over the past twenty years in total more than 2,500 Professional Doctorates in Engineering (PDEng's) have found challenging and exciting jobs in (multi)national companies, including Philips, NXP Semiconductors, ASML, Océ, Ericsson, Infineon, TNO, Vodafone, Shell, Akzo Nobel, Dow, Unilever, and many Small to Medium-sized Enterprises (SME's).

These companies are united in their praise for the quality of the technological designer programs and their graduates and offer them a faster track in their careers.

To ensure their continued enthusiasm, the Stan Ackermans Institute Designer Programs apply a strict selection process, accepting only excellent young professionals and graduates with at least a Master of Science diploma of a (technological) university.

Most of the Technological Designers have found excellent positions in industry, often within the company in which the final design project was carried out or in the company of an industrial partner.

The further development of their careers is much steeper than the development of M.Sc-graduates who started working in industry immediately after obtaining their M.Sc degree.

The quality of the programs is guaranteed by means of a periodic assessment and certification procedure (every 5 years) on behalf of the Dutch Certification Committee for Technological Designer Programs (CCTO, Nederlandse Certificatie Commissie voor Opleidingen tot Technologisch Ontwerper). In the CCTO the three Dutch Universities of Technology, the Dutch Employers' Collective (RCO, Raad voor Centrale Ondernemers organisaties) and the Royal Institution of Engineers in the Netherlands (KIVI NIRIA, Koninklijk Instituut van Ingenieurs) are represented.

Designers who have successfully finished a certified course are entered in the charter of the KIVI NIRIA and receive the title of "Professional Doctorate in Engineering (PDEng).

### TU/e Department Electrical Engineering:

In June 2008 the TU/e Department of Electrical Engineering has presented its Strategy Plan. Citation:

“Over the past 50 years an explosive growth spurt within electrical engineering has radically altered our society. No other discipline has had such an impact and, although it is not always obvious, our society has become permeated and totally dependent on the products that electrical engineering has produced. The next 50 years will see an even greater change. In many areas, such as communications, care, energy supply, auto motorisation and production automation, we see extensive systems on the horizon, coupled together in ever increasing complexity.

*The Faculty of Electrical Engineering concentrates its activities on the analysis, synthesis and management of complex connected systems concerned with manipulating or guiding electromagnetic quantities. This is achieved by training highly qualified and academic people and by providing to the best of its ability new knowledge based on high quality research. The faculty aims to make a contribution to society by stimulating an improvement in the quality of life in a general sense and by being a leading innovative force behind the economy.*

Our research is based on three important societal themes:

- Care and Cure
- Connected World
- Smart and Sustainable Society

#### *The Connected World*

For our first theme we have chosen telecommunications, which are of great importance to our modern society. By means of this theme the faculty hopes to aim at design, realization and validation of a coherent broadband and narrowband communications technology. We are working on both wired and wireless technology. At this moment the expertise of the chairs is focused on two important areas: high data rate global and short-range communication; and ultra-low-power wireless communication links.

#### *Care and Cure*

The theme Care and Cure is concerned with the medical side of electrical engineering; that is patient-centred care with the focus on prevention, early diagnosis and aftercare, with the goal of making hospital intake less necessary. By means of this, the quality of care can improve, the patient can exercise more control over his own health and costs become lower. The focus is on perinatology, cardiovascular disorders, neural disorders, sport and lifestyle.

#### *Smart and Sustainable Society*

Our third theme, Smart and Sustainable Society, aims at designing, realising and validating technologies to make possible electrical networks and electro physical devices for transporting and manipulating electrical energy in a flexible, controlled and sustainable way regarding efficiency of costs, power and materials. The focus lies on intelligent power networks, smart actuators, automotive applications and the reduction of pollution and waste.”

### **Technological Designer Program on Information and Communication Technology:**

The Technological Designer (PDEng) Program on Information and Communication Technology, being part of the TU/e Department Electrical Engineering, benefits of the recently defined research focus of the Department.

In the framework of (final) PDEng projects results obtained in basic research are applied to application-driven industrial projects. We call this process “knowledge transfer”.

For example the TU/e Centre for Wireless Technology (CWTe) is a strong cooperation between five Research Chairs of the Department Electrical Engineering of the Eindhoven University of Technology and a number of industrial partners. They work together to investigate wireless technologies from antenna to the network layer. See: ([http://w3.ele.tue.nl/en/centre\\_for\\_wireless\\_technology/](http://w3.ele.tue.nl/en/centre_for_wireless_technology/)).

Actually CWTe has defined three Research Programs:

- Ultra-High Data Rate program  
[http://w3.ele.tue.nl/en/centre\\_for\\_wireless\\_technology/programs/ultra\\_high\\_data\\_rates/](http://w3.ele.tue.nl/en/centre_for_wireless_technology/programs/ultra_high_data_rates/)
- Ultra-Low Power program  
[http://w3.ele.tue.nl/en/centre\\_for\\_wireless\\_technology/programs/ultra\\_low\\_power\\_program/](http://w3.ele.tue.nl/en/centre_for_wireless_technology/programs/ultra_low_power_program/)
- THz Imaging Program  
[http://w3.ele.tue.nl/en/centre\\_for\\_wireless\\_technology/programs/thz\\_imaging\\_program/](http://w3.ele.tue.nl/en/centre_for_wireless_technology/programs/thz_imaging_program/)

Actually, the following groups participating in the TU/e Centre for Wireless Technology are participating in our Post-Master Designer Program on ICT:

Electromagnetics (EM)

<http://w3.ele.tue.nl/nl/em/>

Mixed-signal Microelectronics (MsM)

<http://w3.ele.tue.nl/en/msm/>

Signal Processing Systems (SPS)

[http://w3.ele.tue.nl/en/sps/research/themes\\_and\\_projects/](http://w3.ele.tue.nl/en/sps/research/themes_and_projects/)

Electronic Systems (ES)

<http://www.es.ele.tue.nl/>

In addition the following Research Chairs also are offering supervision of SAI-ICT PDEng candidates:

Electromechanics and Power Electronics (EPE)

<http://w3.ele.tue.nl/en/epe>

Electrical Power Systems (EPS)

<http://w3.ele.tue.nl/en/eps/>

The co-operation with the Stan Ackermans Institute Designers Program on Software Technology (<http://www.ooti.win.tue.nl/>) offers additional possibilities to find matching expertise.

### **What is the content of the ICT-program ?**

The Post-Master Technological Designer Program on ICT takes two years full-time and consists of:

- 1) Course program (12 months fulltime) consisting of (a.o.):
  - 1a) Design-oriented courses and projects (Post-MSc level)
  - 1b) Development of personal skills
  - 1c) Individual and project related technical specialization: Lectures, assessments, (industrial) projects
  - 1d) Project Based Management
  - 1e) Workshops on Intellectual Property and Valorisation, Entrepreneurship and (Scientific) Integrity
  - 1f) In exceptional cases, a limited number of homologation courses can be offered.
- 2) Technological Design project (12 month full-time)

An individual course program is composed taking into account candidates' background knowledge, future interest, supervisors' and industrial prerequisites.

Design skills, communication and management capabilities will be developed. Specially designed courses on post-masters level are offered, usually as workshops with practical teamwork.

The industrial design project, with a net time of about 12 months, preferably is an industrial project.

An example of an individual Training and Coaching Scheme and a study guide, including an overview of the content of the courses is available:

<http://w3.ele.tue.nl/en/>

[http://w3.ele.tue.nl/en/education/post\\_msc\\_program\\_sai\\_ict/](http://w3.ele.tue.nl/en/education/post_msc_program_sai_ict/)

### **Past performance:**

In the past 20 years about 180 Technological Designers trained in Information and Communication technology have found excellent positions in industry in The Netherlands as well as elsewhere.

### **Publications:**

Reports on these projects appear in bibliographically traceable publications. TU/e takes care of the admission procedure in the ISBN-register and supplies the Royal Library with information for central-registration necessary for libraries, bookshops and other interested parties like (international) companies.

Further, we encourage PDEng candidates to publish their results in reviewed international conferences and media.

### **PhD program:**

Excellent candidates can be offered a continuation towards a PhD after successful PDEng graduation.

For your information:

- The total time required for obtaining a PhD on Design on top of the PDEng is comparable to the direct way.
- So far, about 20% of all PDEng candidates have successfully finalized a PhD.
- TU/e offers the possibility to obtain a doctor's degree on design if scientific breakthroughs on technology or methodology have been achieved in the context of a design and if funding is available.

### ***Application and procedure:***

The TU/e Stan Ackermans Institute Program on Information and Communication Technology (ICT) is open to recently graduated M.Sc students from top-universities only. To be more specific: only those candidates holding a M.Sc-degree that is recognized by the Netherlands Organization for International Cooperation in Higher Education ([www.nuffic.nl](http://www.nuffic.nl)) and those candidates having passed a regular post-B.Sc scientific study program of at least two years and in the fields of Electrical Engineering, Physics, Computer Science or Mathematics can apply.

Admission requests from applicants holding a degree in science or engineering from a University of Applied Sciences (Germany: Fachhochschule) can be considered only in case the applicant has several years (typically 5 years) of industrial experience in design-oriented projects.

For more information about the Dutch Higher Education System see:

<http://www.nuffic.nl/international-students/dutch-higher-education/education-system>

<http://www.nuffic.nl/international-students/docs/esnl.pdf>

<http://www.nuffic.nl/international-students/docs/Diagram-DES.pdf>

We are requesting the results of an actual IELTS English test, not older than 1 year. See [www.ielts.org](http://www.ielts.org) for more information about this test). The minimum requirement is an average result of 6.5. None of the sub-results (reading, writing, listening and speaking) should be less than a score of 6.

We apply high admission standards in order to guarantee the quality of the programs and to prevent disappointment of candidates. Excellent results obtained in previous studies, motivation and personality are decisive factors. In addition, acceptance nowadays is depending on the availability of projects funded by industry as well as the availability of a supervisor from one of the participating TU/e Research Chairs. The number of available positions is limited.

It's our policy to find a design-related industrial project related to a candidate's background and (future) interest, as well as a TU/e staff member able and willing to act as a candidate's supervisor for the entire period of her/his appointment (2 years).

Application is possible at any time. However, and due to the matching process as described above, we are encouraging you to apply before December 31<sup>st</sup> (to be admitted September 1<sup>st</sup> of the following year) or May 31<sup>st</sup> (to be admitted January 15<sup>th</sup> of the following year. In any case please contact the Director of the Program SAI-ICT.

You can send your application, preferably by e-mail with (scanned) PDF attachments to:

TU/e Stan Ackermans Institute, Program Information and Communication technology  
Department of Electrical Engineering PT 9.24  
P.O. Box 513  
5600 MB Eindhoven  
The Netherlands

Attn.: Mr. Prof. Dr. L.M.F. Kaufmann      E-mail: [L.M.F.Kaufmann@tue.nl](mailto:L.M.F.Kaufmann@tue.nl)

**Your application should include:**

- Your motivation and particular interests that you may have.
- An extended Curriculum Vita including your address(es), telephone number(s), fax number and e-mail address. Information about your work experience can be of great value.
- Copies of your original (B.Sc and M.Sc) diplomas, certificates, lists of subjects and your results, as well as their certified (English) translations.
- Copy of your M.Sc graduation report and published papers (PDF files).
- The results of your IELTS test (not older than 1 year). The minimum requirement is an average result of 6.5, whereas none of the sub-results (reading, writing, listening and speaking) should be less than a score of 6.
- At least two (scanned) letters of recommendation printed on official company paper and originally signed.
- A (scanned) copy of your passport .
- In case you already have a Permit of Stay and Work Permit for The Netherlands, a copy must be sent as well.

**Procedure:**

After receiving your application we will:

- Inform you about the receipt of your application.
- Check whether you have sent all documents as required.
- Inform you about the results of our check, especially about the level of your M.Sc-degree after comparison with NUFFIC standards. In case you have obtained an M.Sc-degree from a University not known to us, we will ask our University's Student Dean for advice. You will be informed about this advice.
- In case your application cannot be accepted you will be informed as soon as possible (we aim at informing you within 4 weeks after receiving your application). Please keep in mind TU/e holidays for staff members (July and August). Sending your application late will certainly cause delays.
- In case your application can be accepted from educational point of view, we will contact you. A formal (phone) interview with the members of the TU/e SAI-ICT Management Team and a P&O staff member will be arranged.
- The next steps in the application procedure are: to find a TU/e supervisor as well as an industrial project; the Director of the TU/e Program SAI-ICT is responsible. A formal (phone) interview with the TU/e supervisor(s) will be arranged. All results are essential for finalizing our decision upon appointment.
- After selection you will be appointed as an PDEng candidate (assistant-in-training) for the duration of the program, for a maximum of two years. You will be a member of the scientific staff of the TU/e and will receive a salary in accordance with government regulations. You do not have to pay any tuition fees, except for books, etc.
- When you come to The Netherlands please bring along an officially translated legalized/verified birth certificate (not older than 6 months). Please check at the Dutch Embassy what kind of stamps you need on these documents. In case of an appointment you have to show this birth certificate at Eindhoven's Town Hall.