



# Professional Doctorate in Engineering

## Post-MSc programmes



“Technology is the driving force of the modern society. It is not only needed for economical growth: it is essential for our quality of life and to find answers to the serious problems our planet is encountering. Therefore we need many excellent engineers. A master programme in engineering is a good start, but it takes years of practice in industry to develop the right skills and to obtain the right insight to become a top-level designer. Therefore we developed the two-year Professional Doctorate in Engineering (PDEng) programmes.

With these programmes you can speed up your career essentially. The trainees of these programmes are strongly selected. Their design project is their passport to the world of technological design. In the past they made significant contributions to the technological development of companies, mainly in the Netherlands. Therefore I recommend young masters in engineering to apply for a PDEng programme.”

**Professor Kees van Hee, PhD**

Director 3TU.School for Technological Design,  
Stan Ackermans Institute

**Professor Stan Ackermans, PhD**

Professor Stan Ackermans, PhD, (1936-1995) was professor of Mathematics at TU/e before becoming the university's Rector (1982-1985). He championed the introduction of the design educational programmes. From 1986 until his death in 1995 Professor Ackermans was the first

scientific director of the Institute that coordinated the design programmes within TU/e. Following his death, the institute was renamed Stan Ackermans Institute in his honor. Since 2006 it's called 3TU. School for Technological Design, Stan Ackermans Institute.



# Boost your career!

Are you a graduate young professional or currently completing your Master of Science programme at a (technological) university? Are you looking for an even faster successful career in industry or business? Then you should consider applying to one of the technological designer programmes at the 3TU.School for Technological Design, Stan Ackermans Institute.

## **Two-year programmes**

Together the three Dutch universities of technology – Delft University of Technology, University of Twente and Eindhoven University of Technology – offer exceptional two-year programmes that will put you on a faster track to a successful career in industry. In addition to broadening your technological expertise, you will also learn more professional skills that will enhance your career opportunities. Industry offers engineers from our programmes excellent jobs, because of the strong reputation of our graduates.

## **High-tech industry**

As well as that, the technological designer programmes were initiated at the request of the Dutch high-tech industry. 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 high-tech industry, offering you the opportunity to participate in large-scale, interdisciplinary design projects. With this unique cooperation we provide you with a valuable network of contacts in industry. The technological designer programmes clearly meet an important need of the Dutch hightech industry. Over the past twentyfive years more than 3,000 of our graduates have found challenging and exciting jobs with (multi-)national companies, including Philips, ASML, Océ Technologies, Akzo Nobel, Vodafone, Ericsson, DSM, Unilever, Schiphol Airport and TNO. These companies are united in their praise for the quality of the technological designer programmes and their graduates, and offer them a faster track in their career. To ensure their continued enthusiasm, the programmes employ a strict selection process, accepting only excellent young professionals and graduates with at least a Master of Science diploma from a (technological) university.



Krishnan Seetharaman from India is an alumnus of the Design and Technology of Instrumentation (DTI) programme.

“In September 2009 I graduated as a PDEng of the DTI programme.

During the DTI programme, I expanded my theoretical knowledge by electing courses of my choice. Apart from the technical courses, there were also Professional Development workshops for all PDEng trainees at TU/e. These workshops helped me to develop interpersonal skills and technical communication skills required for the industrial work environment. My one year design thesis at NXP Semiconductors prepared me to face challenges in design based projects and it gave me a sound footing.

I also took part in an intensive two-weeks Dutch course. This improved my language skills and gave me a strong motivation to socialize and integrate with people here and with the Dutch work culture.”

# 3TU.School for Technological Design, Stan Ackermans Institute

As part of their more intensive cooperation, the three Dutch universities of technology have decided in 2006 to combine their technological designer programmes in the 3TU.School for Technological Design, Stan Ackermans Institute.

## **3TU technological designer programmes**

The 3TU technological designer programmes offer you an opportunity to enhance your expertise and project management skills with an extensive hands-on assignment, supervised by experienced professionals. Each programme covers a different speciality, for example managing complex architectural construction projects, designing mechanisms for user interfaces for consumer products or developing high-tech software systems for software-intensive systems. The focus of the programmes is described further on in the brochure.

## **Professional Doctorate in Engineering**

The two-year, full-time programmes all lead to a Professional Doctorate in Engineering (PDEng) degree. If you are accepted into one of the programmes, you will be appointed as a trainee for the duration of two years and will receive a salary. All technological designer programmes are taught in English. The structure of all programmes is more or less the same: during the first part of the programme you will gain extensive knowledge and experience of the latest design methods and their applications. You will also learn to work in interdisciplinary teams and will further develop your professional skills. You will apply what you have learned during the second part of the programme, when you will design an innovative industrial product or process for one of many prominent high-tech companies. The close cooperation between these companies and the technological designer programmes offers exciting career opportunities. Many of our graduates are offered a job with the company in which they did their final project or find work through the extensive network of contacts they have acquired.

## 4 Programmes

A short description of the technological designer programmes is given on these pages. More designer programmes are in development.

For more information: [www.3tu.nl/sai/programmes](http://www.3tu.nl/sai/programmes)

### Architectural Design Management Systems (ADMS)

*Location: Eindhoven University of Technology*

The ADMS programme focuses on the improvement and innovation of architectural design processes, both in relation to the remodelling of such processes and to their organisation and management.

### Automotive Systems Design (ASD)

*Location: Eindhoven University of Technology*

The programme focuses on systems design, during which the PDEng trainees focus on strengthening both their technical and non-technical competencies related to the effective and efficient design and development of technologies and applications for modern high tech automotive systems in the context of smart mobility societal challenges. In particular the programme focuses on the multi-disciplinary design aspects of project-based research and engineering in high tech automotive systems, and the challenges that are faced by the automotive industry: a systems approach to problems around mobility and fuel efficient automotive systems, including communication systems and electrical driving.

### BioProduct Design (BPD)

*Location: Delft University of Technology*

The current developments in the Life Sciences and their vast opportunities for application require a new type of product designer. As a BioProduct Designer you develop products based upon or related to biological systems.

### Bioprocess Engineering (BPE)

*Location: Delft University of Technology*

In the BPE programme, you will develop into an experienced team-worker with a strong background in Biosciences & Chemical Engineering required for innovative bioprocess design.

### Civil Engineering (CE)

*Location: University of Twente*

Industry asks for highly qualified designers in the field of civil engineering, with knowledge of the different technical and nontechnical aspects of actual civil engineering issues (such as economics, policy, law and business administration, but also knowledge on project and process management). These designers will have to have the skills to play a key role in multidisciplinary design teams that are concerned with solving these complex issues.

### Comprehensive Design in Civil Engineering (CDCE)

*Location: Delft University of Technology*

Developments in Civil Engineering and Geosciences in both the civil sector and at universities have enabled the development of new products and processes. A new type of designer is required in order to be able to capitalise on this. A PDEng programme will provide these designers. As is the case with other design programmes, this PDEng programme will involve intensive interaction with the professional sector and will promote technology transfer.

### Design and Technology of Instrumentation (DTI)

*Location: Eindhoven University of Technology*

Instrumentation forms the basis for measurements in a broad range of products and high-tech systems. Instrumentation extends from MEMS oscillators at a micron scale to density measurements of dredger slurry in pipes of a meter diameter. A careful analysis of both the physical problem, as well as the needs of the environment is required to come to the right solution. The programme has a practical focus: two short and one long traineeship at three high tech companies.

### Energy and Process technology (EPT)

*Location: University of Twente*

The technological designer in the field of EPT creates innovative technical solutions for products and processes in the food, energy and process industry. For this purpose a multidisciplinary approach is required starting from functional and market requirements with an accent on quality, environment, safety, sustainability and recycling. Besides deepening and broadening of knowledge during the whole course several assignments in industry will be carried out.

### Information and Communication Technology (ICT)

*Location: Eindhoven University of Technology*

To provide the skills to specify, design, build, test and evaluate complex multidisciplinary systems (a.o.) in the area of three important societal themes chosen by the TU/e Department of Electrical Engineering: 'The Connected World', 'Care and Cure' and 'Smart and Sustainable Society'.

### **Logistics Management Systems (LMS)**

*Location: Eindhoven University of Technology*

The logistics and management of complex industrial processes require insight in planning, organising and controlling the flow of goods from raw material to end user, as well as logistics aspects of workflow management. The LMS programme is designed to broaden, increase and integrate your knowledge and skills in the field of logistics.

### **Mathematics for Industry (MI)**

*Location: Eindhoven University of Technology*

The MI programme is designed to develop problem solving abilities that focus on the mathematical components of design processes taking place in industrial environments.

### **Process and Equipment Design (PED)**

*Location: Delft University of Technology*

The PED programme trains MSc graduates to become qualified designers capable of designing 'fit for purpose' and 'first of a kind' (chemical) products, processes, equipment and devices. It encourages trainees to actively look beyond the boundaries of their own discipline, and to creatively aim for ingenious design solutions demanded by society.

### **Process and Product Design (PPD)**

*Location: Eindhoven University of Technology*

The process industry demands an integrated approach to chemical, physical and mechanical processes. The PPD programme focuses not only on process design, but also on the relationship between the product, its functionality and its microstructure.

### **Robotics (R)**

*Location: University of Twente*

The technological designer in Robotics creates innovative robotic solutions for medical, industrial and safety purposes, such as operative or rehabilitation robotics, welding robots for use in the metal industry, and independently operating robots performing inspection tasks. To develop these robots, a multidisciplinary approach is required with components from mechanical, electrical, computer and control engineering. Besides deepening and broadening of knowledge during the whole course, several assignments in industry will be carried out.

### **Smart Energy Buildings and Cities (SEBC)**

*Location: Eindhoven University of Technology*

The SEBC programme trains MSc graduates to become a technological designer. They are capable to integrate relevant knowledge in a process of Integral Designing to a dedicated, Smart Energy system for the built environment. Based on his specialty, a SEBC designer can contribute to the development of:

- Intelligent and energy efficient building components and/or
- Building concepts aimed at the intelligent use of as less as possible energy and/or
- Intelligent networks aimed at the alignment of supply and demand of energy.

### **Software Technology (ST)**

*Location: Eindhoven University of Technology*

The development of software for advanced systems has many different aspects. The ST programme focuses on the project-based design and development of software for resource-constrained software-intensive systems such as real-time embedded systems.

### **User System Interaction (USI)**

*Location: Eindhoven University of Technology*

Consumer electronics, modern interactive websites or innovative shopping aids for elderly people require userfriendly interaction between humans and systems. The USI programme trains you as a designer with the skills to develop these interactions.



Roel Truyen is a Principal Scientist at Philips Healthcare. He coaches trainees of the Software Technology programme.

“The nice thing about being a supervisor is the exploratory nature of the assignments. In the programme of a design project the trainee joins us in the search for an answer to the question ‘what is it that we actually want?’ It is not just about the ‘how’ but also, and largely, about the ‘what’.

It concerns projects that are not contained within our focus and for which we have no solution ourselves. The trainee’s solution is, therefore, often surprising. I find it interesting to take that journey together towards a solution.”

# Application, selection and degree

Are you interested in technological design and looking to enhance your skills and expertise to boost your career in business or industry? Are you ready for a two-year training programme while receiving a salary? If so, the technological designer programmes at the 3TU.School for Technological Design, Stan Ackermans Institute are exactly what you are looking for.

## Application

Application is open to university graduates from the Netherlands and other countries. You will at least need a Master of Science degree or equivalent, preferably in the exact sciences. There will be an assessment and selection before you can enter the programme. The programmes of the Stan Ackermans Institute use strict selection criteria to ensure the required high quality. Excellent marks, motivation and a design-oriented attitude are vitally important. You should also have an excellent command of the English language.

## Selection

You can apply by sending your letter of application with a complete curriculum vitae and at least two letters of recommendation (in English). Suitable candidates will be invited for an interview with the selection committee of the relevant programme. Please note that each programme has different starting dates, as well as its own specific admission requirements and selection procedure. The exact requirements and selection procedure for each programme are listed on [www.3tu.nl/sai](http://www.3tu.nl/sai). Click on 'programmes' and visit the individual website of the programme. You can also contact the coordinator of the programme.

## Appointment

If you are selected for the programme, you will be appointed as a trainee for the duration of the programme, up to two years. You will be a member of the scientific staff and will receive a salary in accordance with government regulations. Because you are a trainee, you do not have to pay a tuition fee.

## Diploma and degree

On successfully completing the programme, you will receive a certified diploma. You will be entitled to use the academic degree Professional Doctorate in Engineering (PDEng) and will be registered as a Technological Designer in the Dutch register kept by the Royal Institution of Engineers in the Netherlands (KIVINIRIA). The quality of the programmes is assured by an assessment and certification procedure on behalf of the Dutch Certification Committee for Courses to become Technological Designer (CCTO, Nederlandse Certificatie Commissie voor Opleidingen tot Technologisch Ontwerper).



**Chiu-Ling Chen from Taiwan obtained her PDEng degree for the Logistics Management Systems programme in 2009. She did her traineeship at ASML.**

“ASML has a cooperation programme with TU/e in which people study LMS for two years and then work at ASML for three years. The principal project is the in-company design project, for which I compiled a suitable tool kit for maintenance and repair. In addition, I followed Master’s courses and special workshops for LMS students.

A design education lets you combine academic and practical business experience and gives you a good idea of how you can put your university knowledge to good use within a company.”

# Universities of technology in the Netherlands

## **Delft University of Technology**

TU Delft (TUD) is an entrepreneurial university at the forefront of technological development. As such it is constantly involved in furthering technological advances in the interests of society. By means of its fundamental and applied research and educational programmes, TU Delft trains the engineers of tomorrow.

For more information: [www.tudelft.nl](http://www.tudelft.nl)

## **Eindhoven University of Technology**

Eindhoven University of Technology (TU/e), founded in 1956, is a research-driven, design-oriented university of technology, with the primary objective of providing young people with an academic education within the engineering science & technology domain.

For more information: [www.tue.nl](http://www.tue.nl)

## **University of Twente**

University of Twente (UT), founded in 1961, is one of Europe's finest educational resources encouraging research and entrepreneurship in both technology and social sciences. A young and innovative institute, UT is internationally respected in areas ranging from public policy studies and applied physics to biomedical technology.

For more information: [www.utwente.nl](http://www.utwente.nl)

# [www.3tu.nl/sai](http://www.3tu.nl/sai)

The 3TU.School for Technological Design, Stan Ackermans Institute offers two-year post-master technological designer programmes. The institute is a joint initiative of the three universities of technology in the Netherlands: Delft University of Technology, Eindhoven University of Technology and University of Twente.

[www.3tu.nl/sai](http://www.3tu.nl/sai)  
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