

Traineeships in engineering design:

Engineering Doctorate programmes

- **Product, Process and Equipment Design (P₂ED)**
- **Designer in Bioprocess Engineering (BPE)**

Information for potential industrial partners

Status: 01 February 2023

About our partners

Development & Innovation

Delft University of Technology collaborates with a large number of partners to translate technological innovations into applications from which society will benefit. To facilitate our partners, we constantly map the promising, innovative projects that our students, trainees and researchers are working on. One of the active programmes is the post-Master's technological designer programme known as an Engineering Doctorate (EngD).

Who are our typical industrial partners?

The design traineeships are offered in close collaboration with industrial partners, such as 3M, AkzoNobel, Cargill, ConXys, Corbion, Cosun, DSM, FrieslandCampina, Ioniqa, Janssen Biologics, Nedmag, Sabic, Shell, Tata Steel, Teijin Aramid, TNO, Unilever, and many others.

What are the costs and benefits for the industrial partner?

Master's graduates will be given the opportunity to undertake a salaried traineeship in which they complete a design project tailored to your needs. As the industrial partner, you will be asked to pay TU Delft for the costs incurred by each project. Please note that, according to the 'Europese Steunkaderwet', industrial partners must contribute to the costs incurred by TU Delft in order to avoid unequal competition circumstances between industrial parties. Please contact us for more details.

TU Delft will not charge any further fixed costs that may be necessary for carrying out the project, unless previously agreed by the industrial partner and TU Delft.

However, as the industrial partner, you will also be asked to compensate for the trainee's business travel/meals/lodging costs, commuting costs and additional housing costs up to an agreed maximum. The costs of an IDP project depend on IP distribution, while the costs of a GDP are dependent on the team size.

In addition to having a fit-for-purpose (tailor-made) design project executed by one or more of our select group of graduates, it should be noted that all our collaborating partners become part of the academic network of TU Delft and other TU Delft-wide initiatives, such as the Delft Process & Product Technology Institute (<https://www.tudelft.nl/pro2tech>) and e-Refinery (<https://www.tudelft.nl/e-refinery/>), furthering academic-industry initiatives for a sustainable future.

About our Engineering Doctorate programmes

What is an Engineering Doctorate (EngD) programme?

Delft University of Technology (TU Delft) offers Master's graduates funded (salaried) design traineeships to translate academic developments in (Bio)Chemical Engineering, Life Sciences and Civil & Environmental Engineering into real-life applications and industrial products and processes. A two-year design traineeship offers an application-focused alternative to a four-year PhD position and provides trainees with a solid basis for an accelerated start in an industrial career.

During the programme, the technological designers spend their first year following a dedicated curriculum, which involves courses, interactive workshops and group and practical design assignments, often in close cooperation with industrial partners. Both TU Delft and the industrial partner collaborate in the trainee's education.

In addition to topics with more technological content, the participants acquire professional skills in areas such as stakeholder management, personal and project management, and communication.

The first year also features the Group Design Project (GDP), in which EngD trainees apply the knowledge, skills and know-how acquired in the various training modules to a design project usually put forward by an industrial partner but carried out at TU Delft.

In the second year, the EngD trainees carry out an in-company Individual Design Project (IDP) assignment. Their prior engineering education and the supplementary design training puts them in an excellent position to take on this assignment in close consultation with the client. After successful completion of the programme, the trainee receives the EngD degree.

More general background information on all four EngD programmes can be found at: <https://www.tudelft.nl/en/education/programmes/post-academic-professionals/engd-programmes/>

How many EngD programmes are on offer?

Currently, TU Delft offers three EngD programmes:

- Product, Process and Equipment Design (P₂ED)
- Designer in Bioprocess Engineering (BPE)
- Out of Scope of this webpage: Civil and Environmental Engineering (see further the link in '*What is a EngD programme?*')

What does an EngD P₂ED Product, Process & Equipment Design) programme include?

The Chemical Engineering Product, Process and Equipment Design programme is an advanced-level traineeship that educates Master's graduates to become certified designers. It focuses on innovative design and improvement of chemical processes and process equipment in the areas of: specialty and base chemicals, pharmaceuticals, food and consumer products, oil and gas, and energy. Trainees complete advanced courses in process design, spending a year at a company (industrial partner) and solving practical problems by designing and/or refining an industrial process. The trainees execute two Design Projects (see '*What are the two Design Projects, GDP, IDP?*').

More information on P₂ED can be found at: <https://www.tudelft.nl/en/faculty-of-appliedsciences/education/master-programmes/post-msc-programmes/process-and-equipment-design/>

What does an EngD BPE (BioProcess Engineering) programme include?

The BioProcess Engineering programme focuses on production processes or waste treatment processes within industries that use, or can use, biochemical engineering expertise. Innovative designs are proposed by examining existing knowledge and identifying bottlenecks when implementing certain techniques. Often, expertise from specialized TU Delft researchers can directly be used. This translates into improvements in quality as well as in reduction in costs and in energy use. The scope of the projects is broad; examples include valorisation of waste streams for biofuel and chemical building blocks, the scale up/scale down of biotechnological processes, food processing, biopharmaceutical process development, and process modelling. The trainees execute two Design Projects (see '*What are the two Design Projects, GDP, IDP?*')

More information on BPE can be found at: <https://www.tudelft.nl/en/faculty-of-appliedsciences/education/master-programmes/post-msc-programmes/designer-in-bioprocess-engineering/>

What are the two Design Projects, GDP, IDP?

In the first year, the trainee executes a Group Design Project (GDP) and in the second year an Individual Design Project (IDP).

GDP: 3-5 trainees, 6 months (15 weeks net), start in March or June, project execution at TU Delft in cooperation with, and jointly supervised by, the industrial partner.

IDP: Individual, 1 year (42 weeks net), start in September or February, project execution at the location of the industrial partner, who also offers joint supervision. The trainee may have to relocate to the workplace.

Both projects can be tailored to serve the purposes of the industrial partner, while keeping TU Delft's educational interests in mind.

Examples of completed projects

- Design of a suspension growth crystallisation system for separating di-isocyanate isomers
- Conceptual design of a Gas to Liquids (GTL) process – Application of structured packings
- Design of a gas-liquid Taylor flow reactor for intensifying large-scale industrial processes
- Development of a new generation aerated soap bar manufacturing process
- Pneumatic reactor for continuous coating of nanoparticles with atomic layer deposition
- Design and dynamic optimisation of an intensified reactor for continuous surfactant production
- Process design and development of a chemical conversion route of lignocellulosic biomass to feedstock components for fuels and the chemical industry
- Development of a freeze-drying process for concentrated liposome-based pharmaceuticals
- Process modelling and redesign of dairy product manufacturing process
- UHMW polyethylene reactor design

When does the EngD programme start?

EngD programmes start twice a year. See '*What are the two Design Projects, GDP, IDP?*'. To participate as an industrial partner, please contact us at least four months beforehand.

About the trainees and support organisation

How is the quality of the trainee and the support organisation guaranteed?

Intake:

Trainees are recruited from the top 25% of the MSc graduate population. Enrolment is limited to 12 EngD trainees per year for each programme. In addition to their proven high quality, the applicants must also be highly motivated to ensure completion of the traineeship within two years. The programme welcomes applications from properly qualified students who have successfully completed 5 years of university training (MSc, Ir.).

The Selection Committee evaluates the applications according to several criteria. If the first stage of evaluation is positive, the applicant is invited for an interview and presentation to ascertain their suitability for the EngD traineeship. Typically, less than 10% of applicants are offered an EngD traineeship.

The industrial partner participates in the selection process for the GDP or IDP traineeship at their location.

During the EngD traineeship:

During the EngD traineeship, the trainee is supported by a Scientific Supervisor (usually a TU Delft Professor) and a Senior Design Supervisor (an experienced design engineer with many years of corporate experience). University experts act as supervisors, providing state-of-the-art technology, advising on the structure and execution of the project and ensuring that progress towards the project goals is monitored and refocused if needed. The industrial partner provides coaching through a dedicated Principal.

More information

What about Intellectual Property, Secrecy, etc.?

A dedicated Agreement will be supplied by TU Delft, formally covering all of the necessary items, including:

1. Working Field (including Project Scope)
2. Worker and Supervisors
3. Payment (fixed, incidental, periodic)
4. Information provided by the industrial partner
5. Reporting
6. Rights to existing know-how
7. Assignment
8. Secrecy
9. Rights to the results
10. Liability

What if I would like more information?

Please do not hesitate to contact the following if you have any further questions:

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