

About Philips Drachten

At Philips Drachten, we develop innovative products in the Personal Care and Personal Health domains. As part of a multidisciplinary engineering environment, you will work on real product technology together with experienced mechanical, mechatronics, electronics and software engineers.

Assignment

Philips Grooming and Beauty products use compact drivetrains to transfer motion efficiently and reliably. Bevel gears are applied where motion must be transferred between intersecting shafts. Their meshing quality has a direct influence on efficiency, noise, vibration, durability and overall product performance.

The objective of this assignment is to develop a mathematical model and software that can generate bevel gear geometry and quantify the quality of the resulting gear mesh. The tool should enable engineers to assess and compare bevel gear concepts early in the development process and ease the design and validation of this type of gearset.

Relevance

A practical and well-validated analysis tool would support drivetrain development for future Philips Grooming and Beauty products. It could enable faster evaluation and optimisation of bevel gear concepts, improve understanding of the relationship between gear geometry and meshing behaviour, and help identify potential efficiency, acoustic and durability risks earlier in the design process.

Aimed output

- Develop and implement mathematical models that describe gear tooth engagement and relevant meshing-quality indicators.
- Create a Python-based bevel gear generator in which users can define parameters such as tooth count, gear ratio, module, shaft angle and other relevant geometry inputs, and output the gear quality parameters.
- Implement calculations and visualisations for metrics such as contact ratio, tooth engagement, sliding conditions and potential transmission error.
- Evaluate how key design parameters influence meshing quality and drivetrain performance.
- Validate the mathematical model and software using literature, known gear-design examples and, where feasible, simulation or measurement results.

- Deliver the mathematical model, documented source code, a usable standalone application, a validation report and user instructions.

What we are looking for

You are a student in Mechanical Engineering, Mechatronics, Applied Mathematics, Computational Engineering, Software Engineering, or a related field, with a strong mathematical and mechanical affinity. Python programming experience and an interest in gears, mechanisms and drivetrain systems are preferred.

Why Philips Drachten?

This assignment offers the opportunity to work on a real engineering challenge that supports future Philips Grooming and Beauty products. You will combine mechanical engineering, mathematics and software development, while working alongside experienced engineers in a high-tech product-development environment.

You will be encouraged to take ownership of your assignment while receiving guidance from your supervisor and team. It is a valuable opportunity to deepen your technical knowledge, gain practical development experience and build your professional network within Philips.

Practical information

- **Type of assignment:** Graduation project / Master thesis
- **Preferred duration:** Approximately 5-6 months, to be agreed
- **Location:** Philips Drachten
- **Initiator/Supervisor:** Hedzer Durksz