The Advanced Prototyping minor brings together the most recent agile manufacturing methods and emerging materials in creating functional high-fidelity prototypes. Prototypes are used in various design and engineering disciplines as an early version of a product or a system. They are built for a variety of purposes including to test an idea or concept (e.g., ‘proof-of-concept prototypes’), to represent certain aspects of an intended design (e.g., visual functional prototypes), and to trigger discussion in a multi-disciplinary design team (e.g., ‘boundary objects’).

The course aims at equipping you with a wide range of advanced prototyping skills, techniques and materials to create prototypes, which capture both function and appearance of the intended design. To that aim, the course covers a broad interdisciplinary foundation, in-depth knowledge and practical skills, through (guest) lectures, hands-on workshops and multidisciplinary research/design projects. In addition to the knowledge and skills necessary for building prototypes, the course injects necessary critical and creative thinking to determine which of these techniques might be applied and at which point in the design process, by considering economics, feasibility, fidelity as well as environmental sensibility.

The structure of the minor Advanced Prototyping is shaped around two knowledge/skill-building courses on digital fabrication and emerging materials, and a group project, which combines and applies the related knowledge and skills in the context of specific prototyping assignments.

The course offers

- Lectures and guided workshops on a variety of digital fabrication methods and materials processing.
- Collaboration with other disciplines, including engineering, science, arts, and design.
- Access to the facilities/labs, including the Center for Design for Agile Manufacturing (CDAM), Digital Fabrication Lab (DiFaLab), Emerging Materials Lab, Material Incubator (Mi) wet Lab and BioLab at Science Centre.
The programme
The minor Advanced Prototyping spans a full semester of 30 ECs.

- **Inspirational lectures**
The minor starts with introductory lectures on prototyping theory, basic skill training and inspirational (guest) lectures on prototyping in practice.

- **Knowledge/skill building courses**
The two courses Prototyping with and for Digital Fabrication (PDF), and Prototyping with and for Emerging Materials (PEM) will run in parallel in Q1. These emphasise the role of these technologies and materials in prototyping advanced responsive, adaptive and/or ultra-personalised prototypes (i.e., prototyping with), and the role of prototyping for showing the potential of these material and fabrication technologies (i.e., prototyping for).

In PDF course, you will be exposed to the theories, methods, and techniques on digitalisation, design automation and digital fabrication, including 3D scanning technologies, 3D modeling and parametric design tools (Rhino and Grasshopper), (multi-material) 3D printing, laser cutting, CNC milling.

In PEM course, you will be exposed to the science and art of working with living materials (e.g. bacteria and fungi) in designing structural and responsive prototypes with these materials.

- **Workshops**
To apply the learned skills and to reach concrete and assessable results, lectures are accompanied by small workshops.

- **Advanced Prototyping project**
The obtained knowledge and skills in Q1 are synthesised in the Q2 course of Advanced Prototyping project, through an iterative design process, aiming at building (multiple) prototype(s). In addition to constructing prototypes, you will be testing and evaluating the prototypes and eventually exhibiting both the process and the prototypes at a public venue (e.g., the main hall of IDE faculty).

For whom
Advanced Prototyping minor suits both design-oriented students with science/technology background and 'science/technology' oriented students with an art or design background. The aim is to build project groups by combining students from these different backgrounds to create an environment in which students can reflect on the contribution of each discipline for advanced prototyping.

Selection takes place by means of a random draw, based on the following formula:

- 1/2 from the Faculty of Industrial Design Engineering (TU Delft)
- 1/4 from Engineering disciplines (TU Delft)
- 1/4 other disciplines

This allocation is done to meet the interdisciplinary nature of the minor.

Minors of the Faculty of Industrial Design Engineering are open only for students from academic programmes.