Machines and Constructions

Course guide 2026-2027

Semester	1
Inholland location(s)	Alkmaar
Inholland faculty	N&T
Language of instruction	English
Cycle	Bachelor level
Number of ECTS	30

Subjects

Subject title	ECTS	Course code
Preliminary design synthesis Individual and Group*	15	MACONA MACONB
Final design synthesis Individual and Group*	15	MACODA MACODB
* Note that both modules are to be taken as a whole of 30 ECTS and cannot be followed partially to obtain partial credits.		

Content subjects

The minor Machines and Constructions focuses on the design, analysis and development of mechanical systems and constructions. The programme is organised around a project in which students work in teams on a realistic engineering assignment.
Students go through the full engineering process, including requirement analysis, concept development, engineering calculations, modelling and validation. The project is supported by workshops and lectures on topics such as design methodology, advanced CAD, finite element analysis (FEM), strength of materials, machine elements and manufacturing techniques.
The programme reflects current engineering practice and integrates theoretical knowledge with hands-on application.
Projects are sponsored by industry, research departments and/or derived from BSc Engineering challenges.

Learning outcomes

During this minor you work towards three integrated learning outcomes, which you demonstrate within your project:

Designer (technical competence)

You apply a structured design process to develop a machine or construction. You perform calculations and analyses, select materials and components, apply relevant standards and create validated design models.

Team player (project competence)

You contribute effectively to a project team. You define tasks, contribute to project planning and collaborate efficiently, also in an international or multicultural context.

Communicator (professional skills)

You translate client needs into engineering solutions and communicate these effectively. You substantiate design choices and present results through reports and presentations.

Mode of delivery, planned activities and teaching methods

The programme is based on project-based learning. Students work in teams on design assignments and are guided by lecturers through coaching sessions.

Teaching methods include:

- project work
- workshops and lectures to support the design phases and knowledge
- practical assignments
- coaching and feedback sessions
- self-study

Prerequisites and co-requisites

Students are required to have completed the propaedeutic phase of a technical bachelor programme or equivalent.
Basic knowledge of mechanical engineering, mathematics and CAD is recommended.
It is highly desirable to have a curious attitude!

Recommended or required reading and/or other learning recourses/tools

- CAD software (e.g. SolidWorks or similar)
- FEM/CAE tools (available through our software platform)
- Provided lecture materials and digital learning environment

Assessment methods and criteria

Assessment is based on the integrated project and individual contributions. Methods include:

- project deliverables (design reports, calculations, models)
- presentations
- individual assessment of professional skills
- evaluation of teamwork and contribution

Students must demonstrate achievement of all learning outcomes to pass the minor. This is done by means of a group performance assessment: Group products and Individual Assessment by means of a portfolio that is used to log your activities and contributions.

Lecturer(s)

Lecturers from the Mechanical Engineering programme at Inholland Alkmaar, supported by guest lecturers from industry.