# **ELECTIVES AND COACHING**

### **Electives**

Each Bachelor's program includes electives to match the program to your interests. These allow you to change the emphasis in your program. You can gain more indepth knowledge to develop your overall competence in Industrial Engineering. In addition to the electives offered by the department, electives may also be taken at other TU/e departments to broaden your knowledge. You will select the electives that best match your learning goals.

#### Coaching

Experienced TU/e coaches will give you personalized advice throughout your studies and will help you choose your electives. This way, you will put together a program that matches your interests and ambitions. In addition to a personal coach, your study advisor and senior students will guide you. These students are also the mentors for the group of first-year students you are assigned to. They will help you find your way around your degree program.

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#### P&PD

Personal and Professional Development is a common thread throughout the program. Professional skills (academic writing, project and time management, etc.) are embedded in the courses, and also career activities are part of the curriculum. To help with creating your own learning and development path composed of electives and professionalization activities, you are supported by a coach throughout your studies.

### WANT TO KNOW MORE ABOUT INDUSTRIAL **ENGINEERING?**

Study information Industrial Engineering e-mail: industrialengineering@tue.nl website: tue.nl/bachelorprograms/ie

Information days tue.nl/informationdays

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# First-year courses in the **Bachelor Industrial** Engineering

## **TU/e BACHELOR COLLEGE**

Eindhoven University of Technology (TU/e) combines its bachelor education in the Bachelor College. As a student of the TU/e Bachelor College, you have the freedom to define your study program based on your own interests and ambitions. A large part of your Bachelor's program is made up of your core program, in which you choose the specialized field that you want to work in later as an engineer. This forms the basis of your study program.







# TU/e **EINDHOVEN UNIVERSITY OF**

**TECHNOLOGY** 

#### Industrial Engineering

In the program Industrial Engineering, you will take courses in mathematics, and the different industrial engineering disciplines. In the integration courses you will combine and apply the knowledge you have learned so far on a relevant industrial engineering or business problem. On average, you will spend half your time on industrial engineering topics and half on math and integration. The bachelor/program is taught in English.



#### Challenge based learning and Impact of Technology

In your bachelor program part of the courses will have a challenged based format, i.e. working with real-life cases, developing solutions for clients and working on interdisciplinary challenges. Furthermore, bachelor wide courses on Impact of Technology show you that technology always functions in a broader context. Eindhoven engineers develop technology for users, to contribute to solving relevant societal problems and create economic feasible opportunities. The full course schedule for the Industrial Engineering bachelor's degree program is as follows:

ear 1			
Calculus	Fundamentals of Algorithmic Programming	Fundamentals of Business Information Systems	Fundamentals of Product Innovation
Fundamentals of Work & Organizational Psychology	Foundations of Data Analytics	Fundamentals of Operations Management	Mathematics 2
Mathematics 1	Statistics for IE	Fundamentals of Financial and Management Accounting	Impact of Technology: Engineering Ethics
ar 2			
Design of Business Information Systems	Quality and Reliability Engineering	Marketing Perspectives on Product Innovation	Business Analytics & Decision Support
Methodology for IE Research	Organisational Behaviour for IE	Stochastic Operations Management	Manufacturing Integration Course
Elective	Elective	Elective	Multidisciplinary CBL
ar 3			
Supply Chain Management	Strategic and Organizational Perspectives on Product Innovation	Bachelor Final project	Bachelor Final project
Elective	Elective	Impact of Technology: Engineering for Society	Extension Bachelor End project OR Quantitative Modeling and Analysis of Business Processes
Elective	Elective	Elective	Elective

# FIRST-YEAR BACHELOR COURSES FOR INDUSTRIAL ENGINEERING

Right from the start, you will have lectures, seminars, group assignments and projects. In addition to Calculus and Data Analytics, which mostly deal with theory, you and your fellow students will collaborate on projects. In one project, you may look at a company's purchasing approach, while another project may ask you to view the process from a marketing or logistics perspective. Below, you will find an overview of the first-year courses of the bachelor Industrial Engineering. Courses in the first year concentrate on engineering basics (mathematics, programming), and the fundamentals of all Industrial Engineering disciplines.

#### **Statistics for Industrial Engineering**

As many business processes can be modeled using stochastic variables, statistics is an important toolbox for Industrial Engineers to analyze a problem or situation using quantitative data. This course covers the basics of probability theory and statistics. You will learn to recognize when to use which statistical methods and apply these in the context of problem solving. The course will not only cover the statistical theory, but will pay special attention to the application of the methods, the interpretation of statistical results and the translation to decision making in Industrial Engineering problems.

#### Fundamentals of Work & Organizational Psychology

Competent, motivated and productive employees are a crucial asset for many organizations. Therefore, insight into the human factor in organizational processes is highly relevant for Industrial Engineering, Innovation Management, and Operations Management students. In this course, you will acquire knowledge of 1) important concepts and findings from personnel, work-and organizational psychology, 2) common research methods that are used in the domain of work- and organizational psychology, and 3) basic descriptive and inferential statistics. Straightaway, you can apply what you have learned in three large assignments.

#### **Fundamentals of Operations Management**

This course provides a basic framework for understanding operations management and its organizational and managerial context. At the end of this course, you should be able to: Explain approaches to improving processes, use relevant electronic spreadsheet tools (e.g. solver) to solve operations management problems and analyze relevant quantitative models to solve real world problems.



# tue.nl/bachelorprograms/ie

#### **Fundamentals of Product Innovation**

The course 'Fundamentals of Product Innovation' is built around lectures and assignments. The lectures start by explaining the overall purpose and objectives of product innovation and by detailing the stages of the product innovation process, which entail predevelopment, development and commercialization respectively. Next, the activities carried out in each stage of the product innovation process and the methods and tools that can be applied are covered step by step.

#### **Fundamentals of Business Information Systems**

Modern organizations need business information systems to support their internal operations and their interactions with external parties (suppliers, customers, competitors, government, etc). As such, basic knowledge on the concepts of business information system development and management is essential. Business processes and information systems are interwoven: changing a business process results in changing the information systems supporting it and vice versa. It is therefore also important that you are able to model the complex relation between business processes and information systems. In this relation, data and process models play a key role. A data model specifies which data of the business process the supporting information systems should collect, store and manipulate. A process model specifies the steps in the business process and their interdependencies that have to be supported by the information system. Both types of model can be used to develop or configure information systems that support business processes.

#### Fundamentals of Financial and Management Accounting

Focus of this course is on companies in terms of goods and cash flows. Goods flow through a company from suppliers to customers. These goods flows cause cash flows in the opposite direction, from customers to suppliers of production resources. The success of a company is measured, amongst others, by the amount of profit gained by the activities. Important topics are consequently: (relevant) costs, cost calculations, revenues, and financial performance and position.

#### **Mathematics 1**

This course is sequel to the Calculus course, focused on topics that are relevant for Industrial Engineering. You learn logics, performing calculations with matrices, and how to solve linear systems of equations. Probability plays a role in many models. This course makes a start with elementary probability theory including the necessary set theory. You will learn the uniform, binomial, and geometric distribution as well as the required mathematics for this: sequences and series.

#### Mathematics 2

Many business problems (transport, distribution, stock, production, etc.) can be modeled as optimization problems. Some are deterministic in nature (inputs are known in advance), others involve uncertainty (e.g. demand in supply problems or arrivals in production problems). In this course, mathematical models and methods are described for these kinds of IE problems.

#### Fundamentals of Algorithmic Programming for Operations Management

The goal of this course is to teach students fundamental algorithmic programming skills. These skills are needed to make a computer solve operations management problems, optimizing the assignment of production orders to machines and optimizing the sequence in which customers should be served. The course also introduces the basic steps to configure programs with tool chains consisting of existing program libraries.