

# Innovation Management (for non-IE) Elective Package

Innovation Management (for non-IE) Elective Package	
<b>Offered by</b>	Department of Industrial Engineering & Innovation Science
<b>Language</b>	English
<b>Primarily interesting for</b>	All students except Industrial Engineering (TBdk)
<b>Prerequisites</b>	None
<b>Contact person</b>	dr. Jeroen Schepers (J.J.L.Schepers@tue.nl)
<b>Other important info</b>	<p>Apart from an introduction into Innovation Management, this elective package also provides easy access to TU/e's Innovation Management master for TU/e bachelor students (see <a href="http://www.im-master.nl">http://www.im-master.nl</a>).</p> <ul style="list-style-type: none"> <li>• After completing this elective package, the following requirements apply for enrollment in the Innovation Management master: <ul style="list-style-type: none"> <li>• Data science and Sustainable innovation majors can directly enroll in the master.</li> <li>• Psychology &amp; technology majors can directly enroll in the master. For these majors, OHV30 may replace 1ZV20. 1ZEUA0 is then still recommended, but not mandatory for enrolling in the master.</li> <li>• Automotive, Applied Physics, Electrical Engineering, Industrial Design, and Mechanical Engineering majors have to do three deficiency courses in the master: (1) 1JP00 or 1JV00 (Q1), (2) 2DD80 (Q2), and (3) 1ZV60 (Q1).</li> <li>• All other TU/e majors will have to do two deficiency courses in the master: (1) 1JP00 or 1JV00 (Q1), and (2) 1ZV60 (Q1).</li> </ul> </li> <li>• The deficiency courses (1JP00/1JV00, 2DD80, and 1ZV60) can be exempted when they are completed as elective courses in the bachelor. Note that 1JK00 may also exempt 1JP00/1JV00.</li> </ul>

## Content and composition

Innovation is essential for the competitive position of companies. Through the development of desirable new products and services, innovation helps to win new customers and strengthens the loyalty of existing ones. However, many new products and businesses fail or do not deliver the expected results because the competitive environment is dynamic and unstructured, which magnifies wrong managerial choices. The Innovation Management elective package covers strategic, organizational, marketing, and operational aspects of innovation, to enhance students' understanding of innovation as a business process and their ability to identify improvements to innovation processes. In a broader sense, it provides engineers with the understanding that products and services are not created, nor launched, by engineers only. Many employees, customers, business units, committees and other entities inside and outside an organization play their part in innovation processes.

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Course code	Course name	Schedule	Timeslot	Level classification
<b>1ZV50</b> OR <b>1ZK10</b>	Fundamentals of product innovation Technology forecasting	Q4 Q1	E D	Introductory Deepening
<b>1ZV20</b> OR <b>1ZEUA0</b>	Marketing perspectives on product innovation New product marketing	Q3 (2023-2024: once and only in Q2) Q1	D A	Deepening Introductory
<b>1JZK40</b> OR <b>1ZVK00</b>	Designing business processes Strategic and organizational perspectives on product innovation	Q3 Q2	C B	Introductory Advanced

## Course descriptions

### 1ZV50, Fundamentals of product innovation

Product innovation is the main driver of growth, profitability and survival of organizations in high-tech industries. The course ‘Fundamentals of Product Innovation’ takes a process perspective on product innovation by focusing on the tactical and operational aspects of product innovation. Completing the course will enable industrial engineering students to: (i) Understand and describe the process of product innovation, explain the importance of its successful operation, and name the most important methods and tools to do so; (ii) Apply, analyze, measure and improve product innovation processes, methods and tools in high-tech organizations.

### 1ZK10, Technology forecasting

Technology forecasting is a field which studies how to assess future changes in the market performance of a technology, the most important factors driving those changes, and what are the likely consequences of those changes for firms, government, and customers adopting the technology. Consequently, technology forecasting tools are used to assess whether, when, and how different stakeholders should invest in a new technology. The primary objective of this course is to provide students with the knowledge to apply basic technology forecasting methods to evaluate real-life technology investment decisions, and how to treat and communicate the uncertainty implicit in the forecasts. In particular, the course covers methods like trend analyses, judgmental methods (Delphi method, expert elicitation), forecasting in manufacturing (learning curves, process-based cost modeling), technology roadmapping (T-plan & S-plan), and emerging techniques like data mining and artificial intelligence.

### 1ZEUA0, New product marketing

This course builds on the process perspective on product innovation by explaining marketing’s role in the innovation process. Although marketing is often seen as an inside-out activity including pricing and promotion, this course presents a contemporary view of marketing as an outside-in activity that helps engineers to make the right choices in high-tech product development. Therefore, the focus is on the marketing analytics that guide these decisions. Upon course completion, students should be able to describe, interpret, and critically evaluate important theory and concepts and apply them in practice. Furthermore, students will be able to design a market research study, to gather data from customers and competitors, to analyze these data using the right tools and techniques, and consequently make engineering choices to design successful new high-tech products.

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## **1JZK40, Designing business processes**

Provide a summary/description of the content, learning goals, etc. This elective is about the design of business processes from an industrial-engineering point of view. This course focuses on business processes before the product launch (innovation, e.g. new product development) as well as after the product launch (e.g., production, service). Assignments focus on the (re)design of an organizational structure (e.g., sociotechnical redesign of an operational process in a production department), and the (re)design of a system (e.g. designing a performance measurement and feedback system for teams, or a decision support system for management). Ultimately, students are empowered to (re)design an innovation process and measure its effectiveness.

## **1ZVK00, Strategic and organizational perspectives on product innovation**

On this course, students first learn to tie together the analysis of the business environment on both the macro (e.g., technological and economic context), and the micro-level (e.g., customers, value chains and competitors), and to draw conclusions on the opportunities for strategic positioning of the firm. We thereafter consider how different types of business strategies assume distinctly different approaches to innovation. As part of that argument, students consider the interlinkages of types of business strategy and key choices in innovation including exploration vs. exploitation, product vs. process innovation, open vs. closed innovation and innovation by technology push vs. by market pull. In the second half of the course, students extend the strategy-innovation nexus into the perspective of organization design. Students are exposed to the wide array of organization design elements and their interlinkages, including processes, structure, staffing, compensation logic, leadership and control. We explore how certain configurations of these elements enable certain types of innovation, allowing the potential of innovation as a driver toward a chosen strategic position to actually materialize.