Business Engineering

Fields of education: Engineering and Information Technologies

1. Professional qualification

Professional career outline

The MSE master's degree in Business Engineering prepares for a professional career in industrial or service companies or in consulting. Possible functions include business development and business engineering as well as the management of quality, risk, technology and innovation. Business Engineers also take responsibilities in the management of products and services or in the operations and systems involved in producing and providing them, e.g. in materials and supply chain management, in the life cycle management of products and technical assets or in business or production analytics.

Professional skills

Graduates in Business Engineering are qualified to use engineering as well as design approaches to innovate, produce and provide products and services. They are able to develop business models and to plan, analyse and control the industrial and service systems involved. Business Engineers are able to consider in the activities above the relevant technological and business constraints and opportunities and to approach them from a risk, quality and life cycle perspective. Business Engineers have a thorough understanding of management information systems, decision support methodologies and the quantitative methods used for business, production, market, and customer analytics.

Entry skills

Specific skills are required to enrol in this profile. Students holding the following Bachelor degree generally fulfil these entry requirements.

- BSc in Industrial and/or Business Engineering[1]

The assessment of the entry skills is part of the enrolment process of the respective school. Students who do not hold one of the above mentioned Bachelor degrees will be individually assessed for their suitability by the respective University of Applied Sciences.

Differentiation to bachelor level

MSE graduates in Business Engineering as against their entry level skills and competencies will first and foremost acquire additional expertise in applying scientific concepts, methods and tools. During their studies they will develop the capabilities to not only apply science-based approaches but also to adapt and develop them for new application areas. Moreover, whereas BSc programs tend to focus on competencies required to work on an operational level, the MSE also conveys competencies needed to operate on more strategic levels. In terms of contents, graduates will have enhanced competencies in quantitative methods, in managing and analysing data and in integrating technologies to innovative systems.

[1] Current names for the degrees related to Industrial and/or Business Engineering at Swiss UAS are: Industrial Engineering, Industrial Engineering and Management, Industrial Engineering and Management Science, Business Engineering, Engineering and Management

2. Profile contents

The profile covers the following content:

Technology and Innovation Management: Technologies are among the most important strategic and operational assets of product and process driven companies as they play a crucial role in developing, producing and marketing innovative products and services as well as innovating business models and processes. Additionally, market developments, trends and customer needs are crucial triggers for innovations. Therefore the subject covers the competencies needed to recognise, plan, develop, exploit, protect and assess technologies as well as customer needs in a structured approach.

Operations and Production Management: Thoroughly understanding the methodologies of Operations Management is fundamental in efficiently and effectively converting labour, energy and materials to products and services that create value for both customers and providers and hence improve the profitability of a company in its business ecosystem. The engineering approach to operations management emphasises the collection and analysis of data and formal models in decision making. Competencies in risk and quality management are additional aspects covered by the subject.

Service Engineering: The service sector is the largest sector of the economy in most industrialised nations and the capacity to invent, implement and improve services has long become a critical success factor in these economies. However, services also have a high significance in the manufacturing sector, where products are enhanced by and transformed into services to create higher value. Service science provides the methodologies and tools to arrange people and technologies such that value is created for customers and providers. As a modern engineering program, the MSE emphasises an engineering perspective on services, focusing on a science-based and structured approach as well as data and information and communication technologies as important drivers.

Business and Production Analytics (including information systems and decision support): Business and Production Analytics describes the methodology of measuring, evaluating, investigating and forecasting historical performance of business and production systems. Historical performance data is used to gain insights for business and production planning. The recommended actions are derived from qualitative and quantitative analyses of large data sets, e.g. by means of advanced statistical and other computational modelling techniques. Visualisation is also an important element to arrive at improved decision making.

Supply Chain Management: Supply Chain Management (SCM) integrates all activities involved in the flow of goods and services from providers to the final customers and is fundamental for achieving company success in a globalised, dynamic and uncertain business environment. The ability to react to customer requirements and matching them with the network resources is critically important in SCM and requires among other things focusing on core competences, making coherent outsourcing/offshoring decisions as well as choosing suitable configurations of the distribution network. Aside from those strategic considerations, decisions have to be made on the tactical and operational levels.

Life Cycle Management: Product Life Cycle Management (LCM) addresses the process of managing the entire life cycle of manufactured products as well as capital equipment such as machines and infrastructures. For manufacturing, LCM focuses on the effective integration of people, data and enterprise systems such as ERP, PLM and MES during development and usage. The possibility to integrate real-time sensor data has fostered the development of closed-loop life cycle management (as against the traditional linear life cycle management paradigm). The LCM of infrastructures and technical assets focuses on management decisions during the life cycle of capital goods. This involves the modelling of wear-and-tear as well as failure behaviour as well as predictive and condition-based maintenance concepts in order to perform risk assessment and management. Moreover, the LCM of infrastructures and technical assets implies decision models covering investment, maintenance and replacement by integrating costs, reliability and availability, risk and value generation.