



International Council of Academic Departments in Engineering and Management (FFBT WI e. V.), German Association for Engineering Management (VWI e. V.) (Eds.)

# Qualifications Framework Engineering and Management



Verband Deutscher  
Wirtschaftsingenieure e.V.

*International Council of Academic Departments in  
Engineering and Management (FFBT WI e. V.), German  
Association for Engineering Management (VWI e. V.) (Eds.)*  
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## **Imprint**

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# **Preface**

## **Prof. Uwe Dittmann (FFBT WI e. V.)**

Future is development – this credo also applies to our education system. Institutions of higher education can only produce graduates for the labor market with the ability to face current business challenges, consciously take on responsibility, and actively help forge our future when the key players carefully observe social trends and, in the case of higher education, continue to develop and refine the strategy and objectives of their degree programs.

The International Council of Academic Departments in Engineering and Management (Fakultäten- und Fachbereichstag Wirtschaftsingenieurwesen e. V., FFBT WI e. V.) is aware of its critical scientific and societal responsibility with regard to forging this future. We took the final revision of the University Qualifications Framework by the Culture Ministers Conference as an opportunity to align the third edition of the Qualifications Framework for Engineering and Management to these newly adopted guidelines. The qualification profile focuses on describing the skills and competences students in Engineering and Management programs develop during their studies. The goal is to teach students to reflect and act in an innovative manner and, in this way, help them continue to grow and develop throughout their professional lives with the help of scientific methods.

A qualifications framework is a systematic description of a graduate's qualification profile. In the increasingly diversified system of higher education, it is especially important for individual degree programs – and particularly for such an interdisciplinary and integrative-oriented independent study program as Engineering and Management – to clearly and transparently formulate the standards that must be satisfied in its curriculum in order to bear the prestigious title of „Engineering and Management“. This qualifications framework serves as a set of guidelines and a quality assurance instrument. It contains a list of the target learning outcomes, a description of the knowledge and skills graduates should possess, a description of formal aspects such as workload

reflected in ECTS credits, admittance criteria, degree designations, and other formal qualifications.

The intention of the framework is to provide orientation when developing and further refining a curriculum and, at the same time, to clearly differentiate the Engineering and Management degree from other degrees. It should also provide a reliable “quality seal” showing that a completed degree in the field continues to represent the highest possible level, one that creates excellent career opportunities for graduates. There is a reason why Engineering and Management is currently one of the three most sought-after degree programs in German-speaking countries with an equally strong reputation among companies.

Engineering and Management programs consist of four defined core areas: engineering sciences, natural sciences and mathematics; business, law and other social sciences; the integration courses, which represent the heart of the program and cover interdisciplinary research questions and interdependencies in a holistic manner; and finally, soft skills and foreign languages. The Qualifications Framework for Engineering and Management provides detailed criteria for how the core areas are weighted and formulates the targeted learning outcomes in the form of knowledge, skills and competences that graduates should acquire in bachelor’s and master’s programs. It also describes the possibility of pursuing a PhD.

I would like to thank all colleagues from our member universities in Germany, Austria and Switzerland who took part in the numerous working group meetings to revise and further develop the Qualifications Framework for Engineering and Management, which was first published in 2012. With our shared critical perspective and constructive suggestions, we have collaboratively reached our goal of putting together a document that does justice to the current requirements of our educational system while adequately integrating impulses from the sciences and society.

I would like to express my particular gratitude to my colleague, Alfred Schätter, who was a driving force in promoting the results of the working groups. He has

consolidated the ideas and contributions of our members and, in doing so, has had a considerable impact on the completion of this third edition.

Our collaboration is however by no means complete; on the contrary, it is part of an ongoing, evolutionary process of further developing this field of study. Beyond the regular updates of this qualifications framework, the next point on the agenda is to prepare a systematic overview, which would enable us to clearly define the concept of the Engineering and Management degree program according to international standards and make such programs comparable beyond the borders of the German-speaking world.

*Pforzheim, April 2019*  
*Chairman of the International Council of Academic Departments*  
*in Engineering and Management (FFBT WI e. V.)*  
*Prof. Uwe Dittmann*



# **Preface**

## **Dr.-Ing. Frauke Weichhardt (VWI e. V.)**

I am pleased to present to you the 1st English edition of the Qualifications Framework for Engineering and Management. The qualifications framework is an important contribution to the definition of study contents and structures of combined management and engineering study programs and thus makes an important impact on the quality assurance in this study area. At the interface between technology and management, training in Engineering and Management has proven successful for many industries now for over 90 years.

The original study concept from the 1920s has been re-defined early in Germany in the 1950s by a three pillars concept of the Berlin model according to the academic directors of the Berlin program Horst Wagon and Helmut Baumgarten. The qualifications framework presented here is intended to go one step further. In addition to the Berlin model, a fourth pillar is added to define the course of study: Besides the traditional study areas such as “Technology” (thus STEM subjects), “Business Administration” and “Integration Studies” now the additional study area of “Soft Skills and Foreign Languages” has been integrated. This takes the global developments in industry and society since the conception of the Berlin Model into account.

The German Association for Engineering Management (Verband Deutscher Wirtschaftsingenieure e. V., VWI e. V.) is the German Association of graduates holding combined academic management and engineering degrees. Only five years after the founding of the first program of this kind in Berlin in 1927, the association took up its work to ensure the academic, practice-oriented and professional development of Engineering and Management within the framework of quality assurance. It has been committed to the quality assurance and further development of such interdisciplinary academic programs ever since.

This qualifications framework, which was created in cooperation with the International Council of Academic Departments in Engineering and Management (FFBT WI e. V.), offers prospective students and universities the oppor-

tunity to obtain information about study contents and structures, in order to create a high-quality offer.

It is important for me to emphasize that this present work was created by a large number of authors from different teaching institutions. Thus, different perspectives illuminate Engineering and Management and, due to their diversity, ensure an excellent result in the definition of the course of study.

My thanks therefore go to all the authors who have worked hard and attended various meetings to produce this outstanding work, thus contributing to the quality assurance of the course for future students.

*Berlin, July 2020*  
*President of the German Association for*  
*Engineering Management (VWI e. V.)*  
*Dr.-Ing. Frauke Weichhardt*

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# 1 The Purpose of Qualifications Frameworks

Qualifications frameworks are used by German institutes of higher education as a reference to categorize and compare the qualifications and competences of graduates from different federal states, educational institutions and subject areas. They are key instruments used to achieve the central objectives of the Bologna Process:

- Making universities and colleges more transparent and integrated
- Supporting student mobility
- Improving the comprehensibility and comparability of degrees
- Recognizing academic achievement and grades
- Describing the qualification profile, qualifications to be achieved (learning outcomes), and the competences and skills, graduates should possess.

Qualifications frameworks are used by German university degree programs as the basis for designing their programs and to support the further development of their curricula.

These higher education qualifications frameworks should not be confused with the European Qualifications Framework (EQR)<sup>1</sup>, which pursues other objectives. The European Qualifications Framework was created to make academic qualifications in the European Education Area comparable. Its purpose is to provide a common reference that can be used as a “translation tool” for different national qualification systems and their assessment levels. This applies to school education, higher education, as well as vocational training.

In order to achieve this, the EQR defines eight reference levels of learning outcomes needed to obtain the qualifications corresponding to each level in all

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1 Europäisches Parlament / Rat der Europäischen Union: Empfehlung des Europäischen Parlaments und des Rates vom 23. April 2008 zur Errichtung des Europäischen Qualifikationsrahmens für lebenslanges Lernen. In: Amtsblatt der Europäischen Union. C111/1–7. Brussels, 2008.

The Qualifications Framework for Engineering and Management serves as a set of guidelines and a quality assurance instrument. The framework establishes minimum standards that must be fulfilled in the framework of a degree program in Engineering and Management at both universities of applied sciences and universities in German-speaking countries. It is intended to provide orientation when conceptualizing and further developing the curriculum in these programs.

The purpose of setting detailed minimum standards for the weighing of academic content serves to differentiate these programs from other similar academic programs. It is also intended to ensure that a completed degree in the interdisciplinary field of Engineering and Management is a prestigious seal of approval that offers graduates excellent career opportunities.