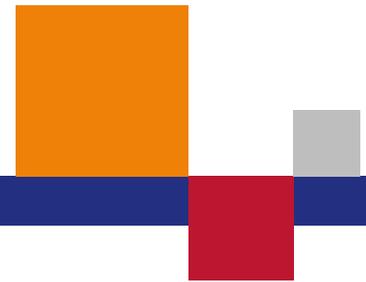




**Wilhelm Büchner  
University**  
of Applied Sciences Darmstadt

# Module Information



**Module Information for the  
postgraduate Master's Program in  
Engineering Management (MBA)**

**International (P01)**

**Version 2.0**







**Wilhelm Büchner  
University**  
of Applied Sciences Darmstadt

## **Module Information**

**Module Information for the  
postgraduate Master's Program in  
Engineering Management (MBA)**

**International (PO1)**

**Version 2.0**





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# Module Information

This module handbook contains descriptions of the modules used in the Master's course Engineering Management (MBA). The course by the Department of Industrial Engineering and Technology Management was first offered in 2012. The General Regulations for Examinations at the Wilhelm Büchner University apply to this course with its modular structure. This module handbook is updated regularly. The following table illustrates the structure of the course as well as the available modules with their respective ECTS credit points (CP) points.

Field/Modules	CP	Type of examination <sup>1</sup>	In semester
<b>Core Subjects</b>	<b>30</b>		
Corporate Management	6	K	1
International Management and Intercultural Communication	6	B	1
Strategic Innovation and Technology Management	6	K	1
Quantitative Methods und Financial Mathematics <ul style="list-style-type: none"> <li>• Statistics</li> <li>• Investment and Financing</li> <li>• Cost and Performance Accounting</li> </ul>	6 (2) (2) (2)	B	1
Compulsory Elective Module	6	B/K	1
<b>Project-based Education</b>	<b>30</b>		
Specialization Compulsory Elective incl. Virtual Seminar	6	B/M	2
Project Work	7	P/M	2
Project Workshop	2	S	2
Master's Thesis/Oral Examination	15	B/M	2

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<sup>1</sup> Key: B – written examination, e.g. assignment, case study, completed at home, K –written examination, M – oral examination, S – credits awarded for attendance, P – project work

## 1 Introduction

The estimated time that a student has to spend at a regular university to complete a course and the examinations is measured in credit points. In Germany it is assumed that students at a regular university spend up to 30 hours to achieve one credit point. These students usually start their course straight after leaving school without or with little prior professional experience.

As a rule, students at the Wilhelm Büchner University have several years of professional experience in addition to their first professional education. They also remain active in their profession whilst studying and this strengthens the links between professional work and studying. We estimate that our students require considerably less time to gain one credit point during their part-time studies. Experience shows that the required time can be reduced by up to 50%. As a rule, one can estimate that students with relevant professional experience require 25% to 30% less time for their integrated studies.

### 1.1 Competencies in Open Learning Studies

The German Qualifications Framework for Lifelong Learning (known by its German abbreviation DQR) forms the basis for the competency model used by the Wilhelm Büchner University. It is a tool for the allocation of qualifications in the German education system.

The objectives of the DQR are increased transparency, comprehensibility and improved comparability of the German qualifications system – both national and within the European Union in relation to the European Qualifications Framework (EQR).

Basis for the allocation is the idea that qualification processes should be based on learning outcomes (“outcome orientation”). Transparent allocations allow comparison between differing national educational objectives in the European Union.

Because the focus is on learning outcomes, competencies can also be acquired through non-formal and informal learning.

The German Qualifications Framework for Higher Education Qualifications (known as HQR) divides professional competency for level 7 qualifications (Master’s study courses) into two sub-categories:

- Knowledge and Understanding
- Skills

The category Knowledge and Understanding relates to broadening knowledge and consolidating knowledge, while the category Skills relates to instrumental, systemic and communicative competencies.

The general competency model is shown in the table.

<b>Knowledge and Understanding</b>	<b>Skills</b>
<p><b>Broadening Knowledge:</b> Master's graduates have a proven level of knowledge and understanding that normally builds on the Bachelor's level and significantly consolidates or extends this. They are able to define and interpret the special features, limits, terminologies and schools of thought in their field of learning. ('Generalist')</p> <p><b>Deepening Knowledge</b> Their knowledge and understanding form the basis for the development and/or application of independent ideas. This may be more practice-oriented or more research-oriented. They have a broad, detailed and critical understanding of the latest state of knowledge in one or more special areas. ('Specialist')</p>	<p>Master's graduates have acquired the following competencies:</p> <p><b>Instrumental Competencies</b> They can also apply their knowledge and understanding as well as their problem-solving skills to new and unfamiliar situations that lie in a broad or multidisciplinary context relating to their academic subject.</p> <p><b>Systemic Competencies</b></p> <ul style="list-style-type: none"> <li>• They can integrate knowledge and handle complexity;</li> <li>• They can make scientifically-founded decisions and draw conclusions, also on the basis of incomplete or limited information, and in so doing can consider social, scientific and ethical insights that also derive from the application of their knowledge and their decisions;</li> <li>• They can independently acquire new knowledge and ability;</li> <li>• They can carry out independent scientific or applied research projects in a largely self-directed and/or autonomous manner.</li> </ul> <p><b>Communicative Competencies</b></p> <ul style="list-style-type: none"> <li>• They can communicate their conclusions, the under-lying information and their reasons to specialists and non-specialists both clearly and unambiguously on the basis of the state of research and application;</li> <li>• They can discuss information, ideas, problems and solutions at a scientific level with specialists and non-specialists;</li> <li>• They can take on lead responsibility in a team.</li> </ul>

Source: Qualifications Framework for German Higher Education Qualifications, adopted on 21 April 2005 by the Standing Conference of the Ministers of Education and Cultural Affairs of the Länder of the Federal Republic of Germany in consultation with the Federal Ministry of Education and Research and the German Rectors' Conference.

The category Knowledge and Understanding relates to broadening knowledge and consolidating knowledge, while the category Skills relates to instrumental, systemic and communicative competencies.

This model with its three knowledge and competency categories with their three-level qualitative evaluations is the basis for the allocation of modules to competency profiles. The following example shows the module *Mathematics for Technology Managers* that focuses primarily on broadening and consolidating knowledge acquired on the Bachelor's level.

Practice-oriented problem-solving skills (instrumental competency) are of some relevance, whereas the ability to discuss information, ideas, problems and solutions at a scientific level with specialists and non-specialists is of little relevance.

Relevance	+	++	+++
Broadening Knowledge			X
Deepening Knowledge			X
Instrumental Competencies		X	
Systemic Competencies		X	
Communicative Competencies	X		

The individual motivation of learners depends on their performance orientation, interests and intrinsic motivation and reveals itself above all in their **self-regulation** of the learning process. Interdisciplinary competencies, for example the self-regulated learning skills in particular of open learning students, can play a valuable support role in the acquisition of technical and scientific contents. Open learning students arrange their learning environment in collaboration with the university's support services.

**Lifelong learning** requires a persistent ability to learn as well as enthusiasm for learning. Students in open learning depend on good self-assessment; they must be able to analyze and understand information and need staying power in order to complete such a course and often hold a job at the same time. These abilities are an elementary requirement for dealing with the challenges of today's information and knowledge society.

The **employability** of Master's graduates is often associated with the combination of specialist knowledge, project management, team spirit and communication skills. This has great significance in particular for open learning and online students, because in most cases they combine their continuing education with professional development. Optimal learning outcomes can be achieved through integration of learning scenarios in the professional context. The opportunity to use the subjects of home and project work and theses in their professional environment also boosts the employability of open learning students in a particular way. The acquired qualifications and competencies can be displayed and applied in the job. This makes supporting of open learning education very interesting for organizations.

## 2. Core Area

### 2.1 Compulsory Modules

<b>Module title</b>	<b>Quantitative Methods and Financial Mathematics</b>																										
<b>Duration</b>	1 semester																										
<b>Language</b>	English																										
<b>Responsible</b>	Prof. Dr. Guido Walz																										
<b>Workload / Credit points</b>	total: 180 h (6 CP) independent reading (35%) self-study and practical work (35%) computer work (10%) exams (20%)																										
<b>Assessment type</b>	B-Type Examination																										
<b>Educational objectives</b>	Students know the quantitative methods as they are used in many business contexts in practice. They understand the basics of probability and random variables as well as the methods of descriptive and inductive statistics. Thus, students are able to use the correct methodology for the given problems throughout the course. They can choose and apply the correct statistical techniques to answer the questions posed by economic problems. Students can apply and assess different methods of investment analysis, and determine application opportunities. In addition, they have a good overview of the elements of cost accounting.																										
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Communicative Competencies</td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>			Relevance Competence	+	++	+++	Broadening Knowledge			X	Deepening Knowledge		X		Instrumental Competencies		X		Systemic Competencies		X		Communicative Competencies	X		
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Instrumental Competencies		X																									
Systemic Competencies		X																									
Communicative Competencies	X																										
<b>Content</b>	<ul style="list-style-type: none"> <li>- Statistics</li> <li>- Events</li> <li>- Random variables (basics, distribution)</li> <li>- Cost accounting as a management tool</li> <li>- Investment</li> <li>- Financing</li> <li>- Lending business</li> </ul>																										
<b>Prerequisites</b>	none																										
<b>Bibliography</b>	<ul style="list-style-type: none"> <li>• Horngren, C. T. et al. (2013): Introduction to Management Accounting, 16 ed., Prentice Hall</li> <li>• Lanen, W.; Anderson, S.; Maher, M. (2010): Fundamentals of Cost Accounting, 3 ed., McGraw-Hill/Irwin</li> </ul>																										

	<ul style="list-style-type: none"><li>• Baker, R.; Christensen, T.; Cottrell, D. (2010): Advanced Financial Accounting, 9 ed., McGraw-Hill/Irwin</li><li>• Shim, J. K.; Siegel, J. G. (2009): Modern Cost Management and Analysis, 3 ed., Barron's Educational</li></ul>
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<b>Module title</b>	<b>Corporate Management</b>																								
<b>Duration</b>	1 semester																								
<b>Language</b>	English																								
<b>Responsible</b>	Prof. Dr. Sabine Landwehr-Zloch																								
<b>Workload / Credit points</b>	total: 180 h (6 CP) independent reading (40%) self-study and practical work (40%) computer work (10%) lectures and exams (10%)																								
<b>Assessment type</b>	written examination																								
<b>Educational objectives</b>	<p>Students can analyze the structure, the opportunities for development and the leadership concepts of enterprises. They can evaluate an enterprise's internal strengths and weaknesses and relate these to its market position. They are able to draw conclusions that are in accord with the planned strategy. They know the rational planning systems that also incorporate personnel and time planning. They recognize financial controlling as an indispensable management tool that is based on cost accounting. They can carry out practical data analysis and determine the information that is to be gained from the data as a basis for management decisions.</p> <p>They understand company-wide planning and have an insight into management information systems and the balanced scorecard. They developed an understanding and problem awareness with regard to functions, duties, processes and systems of management, and the skills to recognize different leadership issues in context.</p>																								
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance \ Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Communicative Competencies</td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>	Relevance \ Competence	+	++	+++	Broadening Knowledge			X	Deepening Knowledge		X		Instrumental Competencies		X		Systemic Competencies		X		Communicative Competencies	X		
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Deepening Knowledge		X																							
Instrumental Competencies		X																							
Systemic Competencies		X																							
Communicative Competencies	X																								
<b>Content</b>	<ul style="list-style-type: none"> <li>- Basics of business management</li> <li>- Strategic management / Tools of strategic business management</li> <li>- Controlling</li> <li>- Business planning and simulation calculation</li> <li>- Reporting and international controlling</li> </ul>																								
<b>Prerequisites</b>	none																								
<b>Bibliography</b>	<ul style="list-style-type: none"> <li>• McFarlin, D.; Sweeney, P. (2010): International Management: Strategic Opportunities &amp; Cultural Challenges, 4 ed.,</li> </ul>																								

	<p>Routledge</p> <ul style="list-style-type: none"><li>• Hill, C. W.; Jones, G. R. (2012): Strategic Management: An integrated Approach, 10 ed., Cengage Learning</li><li>• Horngren, C. T. et al. (2013): Introduction to Management Accounting, 16 ed., Prentice Hall</li><li>• Kreitner, R.; Cassidy, C. (2012): Management, 12 ed., Cengage Learning</li><li>• Robbins, S.; Judge, T. A. (2012): Organizational Behavior, 15 ed., Pearson</li><li>• Rothaermel, F. (2012): Strategic Management, McGraw-Hill/Irwin</li><li>• Vallabhaneni, S. (2008): Corporate Management, Governance, and Ethics Best Practices, Wiley</li></ul>
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<b>Module title</b>	<b>Strategic Innovation and Technology Management</b>																										
<b>Duration</b>	1 semester																										
<b>Language</b>	English																										
<b>Responsible</b>	Prof. Dr. Frank Bescherer																										
<b>Workload / Credit points</b>	total: 180 h (6 CP) independent reading (40%) self-study and practical work (40%) computer work (10%) lectures and exams (10%)																										
<b>Assessment type</b>	written examination																										
<b>Educational objectives</b>	Students have in-depth knowledge of strategic innovation and technology management. They know the relevant basics and can determine the organizational implications of modern innovative organizational development. They have an understanding of the innovation strategies of globally oriented and multinational enterprises. They have an overview of the structure and the mode of action of innovation networks and of the methods and measures in global innovation management processes. In addition, they understand the tools and methods of international innovation controlling as well as the qualitative assessment procedures and economy calculations. They are introduced to the accounting treatment of R&D services in various judicial systems. Students know how cultural frameworks are connected to innovation management. They can explain and categorize the mechanisms of actions of intercultural innovations in connection with the different ways of problem solving in other cultures.																										
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance \ Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Communicative Competencies</td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>			Relevance \ Competence	+	++	+++	Broadening Knowledge			X	Deepening Knowledge		X		Instrumental Competencies		X		Systemic Competencies		X		Communicative Competencies	X		
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Deepening Knowledge		X																									
Instrumental Competencies		X																									
Systemic Competencies		X																									
Communicative Competencies	X																										
<b>Content</b>	<ul style="list-style-type: none"> <li>- Sources of innovative ideas and idea management</li> <li>- Innovation strategy as part of corporate strategy</li> <li>- Ideal-type innovation strategies</li> <li>- Supporting methods (matrix approaches, portfolio approaches)</li> <li>- Trend analysis, scenario technique</li> <li>- Innovation strategy and brand development</li> <li>- Wording of innovation strategies</li> <li>- Basics of technology management</li> <li>- Technology development in the enterprise</li> <li>- Technology life cycle</li> <li>- Methods of technology management</li> <li>- Technology strategies</li> </ul>																										

<b>Prerequisites</b>	none
<b>Bibliography</b>	<ul style="list-style-type: none"> <li>• Jöstingmeier, B., Boeddrich, H.-J. (2007): Cross-Cultural Innovation - New Thoughts, Empirical Research, Practical Reports, Oldenbourg-Verlag.</li> <li>• Trott, P. (2011): Innovation Management and New Product Development, Financial Times Prent.</li> <li>• Ahmed, P. (2010): Innovation Management: Context, Strategies, Systems and Processes, Prentice Hall</li> <li>• Shane, S. (2008): The Handbook of Technology and Innovation Management, John Wiley &amp; Sons</li> <li>• Afuah, A. (2003): Innovation Management, Oxford University Press</li> <li>• Sattler, M. (2011): Excellence in Innovation Management, Springer</li> <li>• Cooper, R. G. (2011): Winning at New Products: Creating Value Through Innovation; Basic Books,</li> <li>• Cooper, R. G. (2009): How companies are reinventing their idea-to-launch methodologies. Research Technology Management, Vol. 52, Iss. 2, March/April 2009, pp. 47-57.</li> <li>• Cooper, R., Slagmulder R., (1997): Target costing and value engineering. Productivity Press, Portland, Oregon.</li> <li>• Ernst, H., (2002):. Success factors of new product development: a review of the empirical literature. International Journal of Management Reviews, Vol. 4, Iss. 1, pp. 1–40.</li> <li>• Kim, J., Wilemon, D., (2002): Focusing the fuzzy front-end in new product development. R &amp; D Management. Sep 2002, Vol.32, Iss. 4, pp. 269-279.</li> <li>• Roberts, E. B. (2007): Managing invention and innovation. Research Technology Management, Vol. 50, Iss. 1, Jan-Feb 2007, pp. 35-54.</li> <li>• Stevens, G. A., Burley, J. (1997): 3000 raw ideas = 1 commercial success! Research Technology Management, Vol. 40, Iss. 3, May/Jun 97, pp. 16-27.</li> <li>• Ulrich, K. T., Eppinger, S. D. (2011): Product Design and Development. McGraw-Hill, Boston.</li> <li>• Wheelwright, S. C., Clark, K. B. (2011): Revolutionizing Product Development. Free Press, New York.</li> </ul>

<b>Module title</b>	<b>International Management and Intercultural Communication</b>																										
<b>Duration</b>	1 semester																										
<b>Language</b>	English																										
<b>Responsible</b>	Prof. Dr. Ulrich Luenemann																										
<b>Workload / Credit points</b>	total: 180 h (6 CP) independent reading (40 %) self-study and practical work (40 %) computer work (10 %) exam (10 %)																										
<b>Assessment type</b>	B-Type Examination																										
<b>Educational objectives</b>	<p>Students know the challenges and characteristics of globalization and internationalization as the basis for an international career. They have the intercultural competency to work and negotiate appropriately with people from various cultural backgrounds. They gain an insight into the relevant cultural differences in communication as well as individual and organizational behaviour in the world's leading economies (focusing on Chinese and US-American culture among other things). Students understand the importance of internationalization for globalization. They can explain historic and current developments and interpret the basic concepts, such as direct investment, motives for internationalization. They are aware of categorization of international organizations, their opportunities and risks, and key indicators of internationalization.</p> <p>They can analyse strategic decisions of the internationalization process and evaluate various forms of cooperation. They demonstrate awareness of and can apply the key strategies available for managing a business in an international environment. They understand the importance of International Management for small and medium-sized enterprises in Germany with their peculiarities and success factors. They can appreciate the management of human resources in an international context.</p>																										
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance \ Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Communicative Competencies</td> <td></td> <td>X</td> <td></td> </tr> </tbody> </table>			Relevance \ Competence	+	++	+++	Broadening Knowledge			X	Deepening Knowledge		X		Instrumental Competencies		X		Systemic Competencies		X		Communicative Competencies		X	
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Deepening Knowledge		X																									
Instrumental Competencies		X																									
Systemic Competencies		X																									
Communicative Competencies		X																									
<b>Content</b>	<ul style="list-style-type: none"> <li>- Strategies and Strategic Dimensions</li> <li>- Basic Terminology and Theories of Intercultural Communication</li> <li>- Methods (Training, Coaching, Mediation et al)</li> <li>- Language, meaning, and cultural pragmatics</li> <li>- Cultural patterns</li> </ul>																										

	<ul style="list-style-type: none"> <li>- Globalization: the collapse of culture</li> <li>- Negotiating interculturality</li> <li>- The power variable</li> </ul>
<b>Prerequisites</b>	English language proficiency at level B2 (CEFR)
<b>Bibliography</b>	<ul style="list-style-type: none"> <li>• Deresky, H. (2013): International Management: Managing Across Borders and Cultures, Text and Cases, 8 ed., Prentice Hall</li> <li>• Lane, H.W.; Maznevski, M. (2014): International Management Behavior: Global and Sustainable Leadership, 7 ed., Wiley</li> <li>• Maxwell, J. C. (2010): Everyone Communicates, Few Connect: What the Most Effective People Do Differently, Nelson</li> <li>• McFarlin, D.; Sweeney, P. (2010): International Management: Strategic Opportunities &amp; Cultural Challenges, 4 ed., Routledge</li> <li>• Mead, R. (2004): International Management: Cross-cultural Dimensions, 3 ed., Blackwell Business</li> <li>• Moll, M. (2012): The Quintessence of Intercultural Business Communication, Springer</li> <li>• Morschett, D.; Schramm-Klein, H., Zentes, J. (2010): Strategic International Management, Springer</li> <li>• Sycara, K.; Gelfand, M., Abbe, A. (2013): Models for Intercultural Collaborations and Negotiation, Springer</li> </ul>

## 2.2 Elective Modules

<b>Module title</b>	<b>Collaboration Engineering</b>																								
<b>Duration</b>	1 semester																								
<b>Language</b>	English																								
<b>Responsible</b>	Dr. Shakib Manouchehri																								
<b>Workload / Credit points</b>	total: 180 h (6 CP) independent reading (40%) self-study and practical work (40%) computer work (10%) lectures and exams (10%)																								
<b>Assessment type</b>	written examination																								
<b>Educational objectives</b>	Students are familiar with the concepts of collaboration. They understand the application of IT and the theoretical concepts for moderation, negotiation and the creative process in collaboration. They know patterns of collaboration and they can identify and explain these. Students understand the procedures to plan and measure collaboration quality. They are equipped with the skills to define and model patterns of collaboration. They know how to identify recurring tasks in collaboration and can analyze and model collaborative work practices. They developed the skills to moderate and model collaboration and to support a creative process. They can apply IT tools to support collaboration. Students can independently and actively evaluate practical methods to analyze, design and model collaboration processes																								
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Communicative Competencies</td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>	Relevance	+	++	+++	Broadening Knowledge			X	Deepening Knowledge			X	Instrumental Competencies		X		Systemic Competencies		X		Communicative Competencies	X		
Relevance	+	++	+++																						
Broadening Knowledge			X																						
Deepening Knowledge			X																						
Instrumental Competencies		X																							
Systemic Competencies		X																							
Communicative Competencies	X																								
<b>Content</b>	<ul style="list-style-type: none"> <li>- Introduction to collaboration</li> <li>- Individual and group goals for collaboration</li> <li>- Patterns of collaboration</li> <li>- Theoretical foundations of collaboration</li> <li>- Collaboration technologies</li> <li>- CSCW and groupware</li> <li>- Social web applications</li> <li>- Web 2.0 and social software</li> <li>- Opportunities in a corporate environment</li> <li>- Moderation and negotiating skills for collaboration</li> <li>- Moderation and facilitation</li> <li>- Goals of moderation, methods, techniques and tools</li> <li>- Harvard negotiation concept</li> <li>- Identifying recurring tasks</li> <li>- Developing collaborative work practices</li> </ul>																								

	<ul style="list-style-type: none"> <li>- Framework for collaborative engineering</li> <li>- Thinklets</li> <li>- Collaboration process design</li> </ul>
<b>Prerequisites</b>	compulsory modules of the first course semester
<b>Bibliography</b>	<ul style="list-style-type: none"> <li>• Boughzala, I. (2012): Collaboration Engineering: A contribution to its foundations through the 2.0 era, LAP LAMBERT Academic Publishing</li> <li>• Breslin, J.; Burg, Th.N.; Kim, H.-G.; Rajtey, T.; Schmidt, J.-H. (2010): Recent Trends and Developments in Social Software, Springer</li> <li>• Doorley, S.; Plattner, H.; Witthoft, S. (2012): Make Space: How to Set the Stage for Creative Collaboration, Wiley</li> <li>• Johnson, J. (2010): Designing with the Mind in Mind: Simple Guide to Understanding User Interface Design Rules, Morgan Kaufmann</li> <li>• Mac Namara, S.; Olsen, C. (2014): Collaborations in Architecture and Engineering Paperback, Routledge</li> <li>• Moaveni, S. (2010): Engineering Fundamentals: An Introduction to Engineering, 4 ed., Cengage Learning</li> <li>• Olsen, C.; Namara, S. (2014): Collaborations in Architecture and Engineering, Routledge</li> <li>• Tabaka, J. (2006): Collaboration Explained: Facilitation Skills for Software Project Leaders, Addison-Wesley Professional</li> </ul>

<b>Module title</b>	<b>Quality management</b>																								
<b>Duration</b>	1 semester																								
<b>Language</b>	English																								
<b>Responsible</b>	Dr. Matthias Scheiblich																								
<b>Workload / Credit points</b>	total: 180 h (6 CP) independent reading (40%) self-study and practical work (40%) computer work (10%) lectures and exams (10%)																								
<b>Assessment type</b>	written examination																								
<b>Educational objectives</b>	Research results show increased competitiveness of enterprises that adhere to the principles of modern quality management. Students have an understanding of these principles; they can think in a customer- and process-oriented manner, and recognize and utilize complex interdependence in systems within the objectives of quality management. In addition, students understand the essential duties of a quality manager and have the skills to set up, implement and develop quality management systems. They are aware of the many facets of quality management and can thus address current approaches to quality management, such as Total Quality Management or Six Sigma. They are competent to identify solutions and make decisions in quality management and can help to organize and develop an enterprise in relation to quality management.																								
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Communicative Competencies</td> <td>X</td> <td></td> <td></td> </tr> </tbody> </table>	Relevance	+	++	+++	Broadening Knowledge			X	Deepening Knowledge			X	Instrumental Competencies		X		Systemic Competencies		X		Communicative Competencies	X		
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Deepening Knowledge			X																						
Instrumental Competencies		X																							
Systemic Competencies		X																							
Communicative Competencies	X																								
<b>Content</b>	<ul style="list-style-type: none"> <li>- Defining the concept of quality</li> <li>- Tasks and organization of quality control</li> <li>- Introduction to quality management (QM)</li> <li>- History of QM</li> <li>- Quality policy and product quality requirements</li> <li>- Basics of process management</li> <li>- Process quality requirements</li> <li>- (QM) Systems based on DIN EN ISO 9000 series</li> <li>- Integrated management systems</li> <li>- Audits as management tools</li> <li>- Introduction to product liability</li> <li>- Quality and profitability, quality control</li> <li>- Basics of modern QM techniques (Kaizen, Total Quality Management, Six Sigma, Total Productive Maintenance, other techniques)</li> </ul>																								

<b>Prerequisites</b>	compulsory modules of the first course semester
<b>Bibliography</b>	<ul style="list-style-type: none"><li>• Das, B. (2013): Quality Management, Gazelle Book Services</li><li>• Peris-Ortiz, M., Alvarez-Garcia J. (2014): Action-Based Quality Management, Springer</li><li>• Low, S., Ong, J. (2014): Project Quality Management, Springer</li><li>• Rose, K: (2014): Project Quality Management, Roundhouse Publishing Group</li><li>Zairi, M. (1991): Total Quality Management for Engineers, CRC Press</li></ul>

<b>Module title</b>	<b>R&amp;D Management</b>																										
<b>Duration</b>	1 semester																										
<b>Language</b>	English																										
<b>Responsible</b>	Prof. Dr. Frank Bescherer																										
<b>Workload / Credit points</b>	total: 180 h (6 CP) independent reading (40%) self-study and practical work (40%) computer work (10%) lectures and exams (10%)																										
<b>Assessment type</b>	written examination																										
<b>Educational objectives</b>	Students understand the importance of R&D for the national economy and businesses, and can explain the different forms. They know the tools for project management and controlling as well as the methods for design of R&D planning processes and their application in research and development projects. They are familiar with the structural elements of research-oriented enterprise design, which includes external research and development units. In addition, they have an overview of the available options for promotion and funding of research.																										
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance \ Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Communicative Competencies</td> <td></td> <td>X</td> <td></td> </tr> </tbody> </table>			Relevance \ Competence	+	++	+++	Broadening Knowledge			X	Deepening Knowledge			X	Instrumental Competencies			X	Systemic Competencies			X	Communicative Competencies		X	
Relevance \ Competence	+	++	+++																								
Broadening Knowledge			X																								
Deepening Knowledge			X																								
Instrumental Competencies			X																								
Systemic Competencies			X																								
Communicative Competencies		X																									
<b>Content</b>	<ul style="list-style-type: none"> <li>- Basics of R&amp;D management</li> <li>- Significance and characteristics of R&amp;D for national economy and business</li> <li>- R&amp;D appearance</li> <li>- Tools and methods for R&amp;D planning</li> <li>- R&amp;D project management</li> <li>- R&amp;D controlling</li> <li>- Organizational R&amp;D integration into the enterprise (macrostructure, microstructure)</li> <li>- Internationalization of R&amp;D</li> <li>- External R&amp;D</li> <li>- Funding and promotion of research</li> </ul>																										
<b>Prerequisites</b>	compulsory modules of the first course semester																										
<b>Bibliography</b>	<ul style="list-style-type: none"> <li>• Akhilesh K.B. (2014): R&amp;D Management (Management for Professionals), Springer</li> <li>• Wei C. (2012): R&amp;D Project Management Body of Knowledge, CreateSpace Independent Publishing Platform</li> <li>• Corre, A., Mischke, G. (2005): The Innovation Game, Springer</li> <li>• Gaubinger K., Rabi M., Swan S., Werani T. (2014):</li> </ul>																										

	<p>Innovation and Product Management: A Holistic and Practical Approach to Uncertainty Reduction, Springer</p> <ul style="list-style-type: none"><li>• Beattie C.J., Reader R.D. (1971): Quantitative Management in R&amp;D, Springer</li></ul>
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### 3. Project-based Studies

<b>Module title</b>	<b>Project Workshop</b>																								
<b>Duration</b>	1 semester																								
<b>Language</b>	English																								
<b>Responsible</b>	Prof. Dr. Gernot Langenbacher																								
<b>Workload / Credit points</b>	total: 60 h (2 CP) independent reading (35%) self-study and practical work (65%)																								
<b>Assessment type</b>	none																								
<b>Educational objectives</b>	A three-day virtual seminar presents methods of scientific work, case study work as well as presentation techniques that are consolidated with case studies and business simulation games. Professional talks to typical questions concerning engineering management form the basis for the project group work that is to be completed after the seminar. Central component of the project workshop is the project start. Here students lay the foundations for their project work in terms of content and organization: team building, selecting of the subject and mentor, milestones etc.																								
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Communicative Competencies</td> <td></td> <td></td> <td>X</td> </tr> </tbody> </table>	Relevance Competence	+	++	+++	Broadening Knowledge		X		Deepening Knowledge			X	Instrumental Competencies			X	Systemic Competencies			X	Communicative Competencies			X
Relevance Competence	+	++	+++																						
Broadening Knowledge		X																							
Deepening Knowledge			X																						
Instrumental Competencies			X																						
Systemic Competencies			X																						
Communicative Competencies			X																						
<b>Content</b>	<ul style="list-style-type: none"> <li>- Case study work</li> <li>- Methods of scientific work</li> <li>- Presentation techniques</li> <li>- Specialist lectures</li> <li>- Project initiation</li> <li>- Project presentation</li> </ul>																								
<b>Prerequisites</b>	none																								
<b>Bibliography</b>	see required option module; additionally, independent literature search relevant to the specialization.																								

<b>Module title</b>	<b>Project Work</b>																								
<b>Duration</b>	1 semester																								
<b>Language</b>	English																								
<b>Responsible</b>	Prof. Dr. Gernot Langenbacher																								
<b>Workload / Credit points</b>	total: 210 h (7 CP) project work (60%) documentation (20%) presentation incl. preparation (20%)																								
<b>Assessment type</b>	project work and oral examination																								
<b>Educational objectives</b>	Key objective is the largely independent completion of a group project that relates to the key competencies and specialization. Students can choose from various methods and forms; for example, model or concept development, optimization, investigation, design recommendations, case study work etc. Much importance is attached to an interdisciplinary approach that incorporates the competencies proportionately and to a sufficient degree. Students demonstrate with this project work that they have the ability to deal with a comprehensive problem in a scientific as well as practice-oriented way. With the final presentation students demonstrate that they are able to present contents at a suitable scientific level to a professional audience with the aid of professional presentation techniques. The line of reasoning and the solution must be well structured and students must be able to justify and defend their overall concept against critical question on the part of the examiners.																								
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Communicative Competencies</td> <td></td> <td></td> <td>X</td> </tr> </tbody> </table>	Relevance Competence	+	++	+++	Broadening Knowledge		X		Deepening Knowledge			X	Instrumental Competencies			X	Systemic Competencies		X		Communicative Competencies			X
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Instrumental Competencies			X																						
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Communicative Competencies			X																						
<b>Content</b>	<ul style="list-style-type: none"> <li>- Selecting a topic</li> <li>- Project work</li> <li>- Writing of the project report</li> <li>- Presentation of results</li> </ul>																								
<b>Prerequisites</b>	participation in the seminar Project Workshop/ project start																								
<b>Bibliography</b>	see required option module; additionally, independent literature search relevant to the specialization																								

<b>Module title</b>	<b>Specialization Compulsory Elective incl. Virtual Seminar</b>																										
<b>Duration</b>	1 semester																										
<b>Language</b>	English																										
<b>Responsible</b>	Prof. Dr. Gernot Langenbacher																										
<b>Workload / Credit points</b>	total: 180 h (6 CP) independent reading (35%) self-study and practical work (35%) computer work (10%) presentation (20%)																										
<b>Assessment type</b>	written examination and oral examination																										
<b>Educational objectives</b>	The key issues that are discussed during the seminar Engineering Management are the basis for the project work that is to be prepared autonomously after the seminar. This advanced specialization paper is to be presented for group discussion during the virtual seminar. Students demonstrate with this work that they have the ability to select and deal with a problem related to a required option module within a specified time limit. Students demonstrate during the virtual seminar their presentation and argumentation skills. The line of reasoning and the solution must be well structured and students must be able to justify and defend their overall concept against critical question on the part of the examiners.																										
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance \ Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Communicative Competencies</td> <td></td> <td></td> <td>X</td> </tr> </tbody> </table>			Relevance \ Competence	+	++	+++	Broadening Knowledge			X	Deepening Knowledge			X	Instrumental Competencies			X	Systemic Competencies		X		Communicative Competencies			X
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Deepening Knowledge			X																								
Instrumental Competencies			X																								
Systemic Competencies		X																									
Communicative Competencies			X																								
<b>Content</b>	<ul style="list-style-type: none"> <li>- Selecting a topic</li> <li>- Advanced specialization paper</li> <li>- Writing of the project report</li> <li>- Presentation and discussion of results</li> </ul>																										
<b>Prerequisites</b>	Compulsory elective module of the first semester																										
<b>Bibliography</b>	see required option module; additionally independent literature search relevant to the specialization																										

<b>Module title</b>	<b>Master's Thesis and Virtual Oral Examination</b>																								
<b>Duration</b>	1 semester																								
<b>Language</b>	English																								
<b>Responsible</b>	Prof. Dr. Gernot Langenbacher																								
<b>Workload / Credit points</b>	total: 450 h (15 CP) independent reading (25%) scientific work and documentation (65%) presentation and defense (10%)																								
<b>Assessment type</b>	The overall result is determined by the grade of the Master's thesis as well as the oral examination.																								
<b>Educational objectives</b>	Students write independently a theory-based practice- or research-oriented thesis. They have the ability to understand theoretical and empirical problems and to apply correct scientific techniques to answer the questions posed by the problem, to gather and evaluate scientific evidence, and to judge and apply the results of scientific research responsibly.																								
<b>Competencies</b>	<table border="1"> <thead> <tr> <th>Relevance \ Competence</th> <th>+</th> <th>++</th> <th>+++</th> </tr> </thead> <tbody> <tr> <td>Broadening Knowledge</td> <td></td> <td>X</td> <td></td> </tr> <tr> <td>Deepening Knowledge</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Instrumental Competencies</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Systemic Competencies</td> <td></td> <td></td> <td>X</td> </tr> <tr> <td>Communicative Competencies</td> <td></td> <td></td> <td>X</td> </tr> </tbody> </table>	Relevance \ Competence	+	++	+++	Broadening Knowledge		X		Deepening Knowledge			X	Instrumental Competencies			X	Systemic Competencies			X	Communicative Competencies			X
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Instrumental Competencies			X																						
Systemic Competencies			X																						
Communicative Competencies			X																						
<b>Content</b>	<ul style="list-style-type: none"> <li>- Selecting a topic</li> <li>- Master's thesis</li> <li>- Oral examination</li> </ul>																								
<b>Prerequisites</b>	see relevant Examination Regulations																								
<b>Bibliography</b>	depending on previous experience and subject																								

