Degree Program Documentation

Master program Master in Management and Technology (TUM-BWL)
TUM School of Management
Technical University of Munich
Program name: Management and Technology (TUM-BWL)

Department: TUM School of Management

Other departments involved in teaching: Chemistry, Informatics, Electrical and Computer Engineering, Mechanical Engineering

Degree: Master of Science (M.Sc.)

Standard Duration of Studies (Credits): 4 Semester (120 ECTS-Credits)

Form of study: Full time, attendance program

Admission: Aptitude Assessment

Beginning: WS 2018/2019

Language: English, English/German – depends on technical specialization

Persons responsible for the program: Vice Dean of Academic Affairs Prof. Dr. Jürgen Ernstberger

Academic Program Director Prof. Dr. Christoph Fuchs

Further details for special degree programs: Double degree program with HEC Paris possible

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Prof. Dr. Christoph Fuchs

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Vice Dean of Academic Affairs Jürgen Ernstberger
Table of Contents

1. Objectives of the study program ................................................................. 4
   1.1 Purpose of the study program ................................................................. 4
   1.2 Strategic importance of the program ...................................................... 4
2. Qualification profile ..................................................................................... 6
3. Target groups ............................................................................................. 9
   3.1 Target group ......................................................................................... 9
   3.2 Prior knowledge of applicants ............................................................... 10
   3.3 Target figures ....................................................................................... 10
4. Demand analysis ......................................................................................... 11
5. Competitive analysis .................................................................................. 12
   5.1 External ................................................................................................. 12
   5.2 Internal ................................................................................................. 13
6. Structure of the degree ............................................................................. 13
7. Organizational affiliation and responsibilities .......................................... 17
1. Objectives of the study program

1.1 Purpose of the study program

The range of interdependencies between individual organizational areas as well as the progressive disintegration of traditional boundaries between departments are changing the type of qualifications required. Firms increasingly demand interdisciplinary thinking and action from its participants. Particularly at the interface between the sectors of management, engineering or natural sciences, communication and know-how barriers repeatedly arise in practice. These barriers result from a lack of knowledge and understanding of the respective other discipline and subject culture. This affects employees in both, technical and business management departments in their everyday working life. While engineers and scientists are increasingly confronted with management tasks, also managers of globally active companies increasingly have to make decisions at the interface between management, engineering or natural sciences. For example evaluation and organisational tasks require a deeper understanding of technical products and processes concerned. Executives with a basic understanding of engineering or natural sciences can work in interdisciplinary teams with engineers or scientists to understand the perspective from the specialist disciplines much more quickly and translate it into management decisions. In this way, they contribute to creating and maintaining competitive advantage for companies and to avoiding higher costs, lower quality and a loss of time.

While the TUM School of Management already offers a basic management education program for students with an undergraduate degree in engineering or natural sciences with its Master in Management Program, the Master in Management and Technology (TUM-BWL) pursues the goal of enabling highly motivated graduates of the TUM-BWL bachelor program or of a comparable first degree program or business graduates with a special affinity for technology to receive a well-founded international education at the interface of management and engineering or natural sciences. The Master in Management and Technology (TUM-BWL) is taught up to 100% in English and aims at both national and international prospective students.

The TUM-BWL brand has established itself on the labor market and is to be further strengthened. At the same time, the course of studies in an international environment contributes to the expansion of TUM as a brand, because graduates with an interdisciplinary profile are increasingly in demand at internationally oriented companies, renowned management consultancies and in science. In addition, interdisciplinary training in the technical, scientific and commercial fields is an ideal prerequisite for founding own start-up.

1.2 Strategic importance of the program

The TUM School of Management offers a comprehensive portfolio of study programs, including its Bachelor, Master and professional study programs. This reflects the idea of lifelong learning and implements the mandate of the Bavarian Higher Education Act („Bayerisches Hochschulgesetz“) to offer degree courses and professional education. In accordance with the strategic orientation of the TUM School of Management, all programs include an international management education at the interface of management, engineering, natural sciences and/or life sciences with a strong entrepreneurial focus. The aim is to provide graduates with a well-grounded, internationally oriented management education and an
understanding of engineering, natural sciences or life sciences to take on responsible roles in business and society. This is promoted for instance by the active memberships of professors of the TUM School of Management in numerous academies and advisory boards, which are concerned with important decisions in science, management and society.

The content of the programs varies according to the different admission requirements and the individual education of the applicants. The programs of the TUM School of Management can be divided into three categories:

(1) Interdisciplinary management programs with a focus on engineering, natural and life sciences: These include the Bachelor’s program TUM-BWL (Management and Technology) as well as the Master in Management and Technology (TUM-BWL) and the Master in Consumer Affairs, which will be replaced by the Master in Consumer Science (MCS) from winter semester 2018/19.

(2) Programs providing a basic management education program for students with a technical or scientific first degree: This category includes the Master in Management (MiM).

(3) Programs in the field of executive education: The area of Continuing Education and Lifelong Learning is structured analogously to this strategy. In the part-time Executive MBA programs for people with professional experience and leadership responsibility, participants are developed into effective and responsible managers by broadening their knowledge, expanding their skills and developing their personality. The Master in Management & Innovation and other planned continuing education programs expand the portfolio of the programs to include the target group of young professionals with initial work experience and (yet) no management experience. The certificate programs are subject-specific programs for the further development of both professionals and managers. They are offered on a part-time basis and are set up specifically for each company in the Customized Programs area.
Against this background, the study program portfolio of the TUM School of Management is structured as shown below in Figure 1.

Figure 1: Study programs offered by the TUM School of Management. Admission requirements of the study programs (light grey), Bachelor program (blue), Master programs (orange), Master programs with study fees and required work experience (dark grey)

2. Qualification profile

The Master in Management and Technology (TUM-BWL) can be studied as a consecutive program after the Bachelor in TUM-BWL/Management and Technology at TUM or as a follow-up to a Bachelor’s program in management. Thus, on the one hand, it builds on the already acquired specialist and methodological knowledge and competences in the field of management. On the other hand, it also builds on basic knowledge in the mathematical-scientific field or on basic, already acquired knowledge and competences in the field of technology. This influences the qualification profile of graduates: Depending on the selected scope and discipline of the management and technology components as well as the initial profile, the following four main types of graduates will emerge:

- Graduates with highly specialized knowledge in one of the management specializations (Innovation & Entrepreneurship; Marketing, Strategy and Leadership; Operations & Supply Chain Management; Finance & Accounting or Economics & Policy). This enables them to carry out planning and organizational tasks, as well as to take leadership responsibility in classical business departments of companies.
- Graduates with special industry-related knowledge (Energy Markets or Life Science & Management), who have built up a specialized analytical profile.
• Graduates who, in particular due to the knowledge and competence in a technical discipline already acquired in their bachelor’s degree, have sound, in-depth engineering and/or scientific knowledge (in the fields of chemistry, mechanical engineering, electrical engineering and information technology, informatics, computer engineering or industrial engineering).

• Graduates who have broad, multidisciplinary competencies in both management and technology and who strive for management responsibility.

After a successful completion of the course, graduates receive the academic degree "Master of Science (M.Sc.)". They have the following competences:

**Professional skills**

Graduates of the Master's program can apply and further develop the concepts as well as the empirical and analytical methods of their chosen specializations in management and technology.

The professional competence in their technical field depends on the amount of courses taken in their technical fields. The graduates who did a minor in their technical specialization have acquired basic skills in this subject. Depending on the intensity of their studies, graduates with a major in a technical subject can also apply concepts from their subject and further develop them at a high level. A similar profile formation is possible in the management area with knowledge in a management specialisation or a broader acquisition of management competencies in various management disciplines.

**Methodological skills**

Graduates of the Master's program are able to work out solutions to problems at the interface between their technical subject and management problems using approaches from both disciplines.

The methodological competences include particularly the scientific innovation achieved. Graduates of the Master's program in Management and Technology can design research questions for underlying disciplines, choose and justify concrete ways of operationalizing research, select and justify research methods, translate them into results and interpret them critically.

**Social competencies**

Graduates can take on management tasks within the framework of complex and internationally oriented projects with a business and technical orientation. The graduates know the different discussion cultures and languages in these areas and recognize conflict potentials. In particular, they are able to reflect and integrate different perspectives of employees with a business and technical orientation and to take these into account in their decisions. In order to meet the requirements of an increasingly international work and research environment in the field of management, in which, for example, internationally oriented teams are to be enabled to work successfully together, all graduates have a minimum of intercultural skills.
**Personal skills**

Graduates have acquired the competence to set a goal based on their strengths, weaknesses and interests and to work towards it through a targeted selection of subjects. In addition, they have proven that they can work persistently on projects (e.g. Master Thesis).

The graduates are fluent in English. A very good knowledge of English is a prerequisite for a successful application and is checked upon submission.

Depending on the individual profile described at the beginning, the Master's program can prepare students for a job as generalists (especially with a minor in technology), for example in management consultancies or in public authorities or associations, as well as for activities in various disciplines of business administration (e.g. marketing, production and logistics planning). In addition, it is also possible to work as an "Industrial Engineer", i.e. an interdisciplinary activity consisting of engineering and management science parts (in the case of a consecutive Master's degree and a "Major" in a technical subject). Depending on the combination of the management and technology subjects, the following job profiles can be developed:

**Innovation & Entrepreneurship in combination with Informatics:**

- Entrepreneur: Foundation or management of an innovative IT start-up/company
- Project manager: Management of an innovative project (e.g. digitisation) within a company (intrapreneurship)
- Product developer: Application of innovation techniques to identify new trends and implementation in IT products

**Marketing, Strategy & Leadership in combination with Mechanical Engineering:**

- Head of Strategy: Strategy development in a start-up or established manufacturing company, e.g. in the automotive (supplier) industry
- Product Manager: Marketing of innovative industrial products
- HR Manager: Taking on HR responsibility and leading teams or projects in the manufacturing industry

**Operations & Supply Chain Management in combination with Chemistry:**

- Production Manager/Logistics Planner/COO: Strategic and operative planning along the value chain as well as application of quantitative methods for decision-making support (Operations Research) in companies of the chemical and pharmaceutical industry.

**Finance & Accounting in combination with Computer Engineering:**

- Controller: Execution of accounting and controlling especially in technical-oriented and international companies
- Employee in/Head of Finance: Acquisition of financial resources and their investment in computer, software and hardware manufacturing companies

**Economics & Policy in combination with Industrial Engineering:**

- Employee of an economic/start-up promotion authority: Comprehensive knowledge of economic interrelationships and possible interventions in the economy
Energy Markets in combination with Mechanical Engineering:

- Employees at energy companies/public utilities: Comprehensive knowledge of the energy trade, the dynamics of energy markets and the supply of energy to various markets (industry/end consumers).

Life Science & Management in combination with Chemistry:

- Product manager for pharmaceutical, food or chemical companies: Knowledge of consumer behaviour and marketing instruments. Product development with a focus on sustainability.

3. Target groups

3.1 Target group
The target group of the Master in Management and Technology (TUM-BWL) are excellent graduates of the TUM-BWL Bachelor’s program, a comparable first degree at the interface of management and engineering/natural sciences or a first degree in business with a high technical affinity from Germany and abroad with very good English language skills. The knowledge acquired in the Bachelor’s program in management, basic mathematical and logical knowledge and, if applicable, knowledge of engineering and natural sciences is of particular interest.

The increasing number of applicants since the introduction of the Master’s degree programs TUM-BWL and TUM-WITEC proves the attractiveness of Master’s degree programs at the interface between management and engineering sciences both for students from interface degree programs (formerly for TUM-BWL) and graduates of purely management based Bachelor’s degree programmes (formerly for TUM-WITEC) (cf. Figure 2).
3.2 Prior knowledge of applicants

An aptitude assessment procedure ensures that the applicants have the necessary knowledge in the field of the basics of management, economics, statistics and mathematics as well as empirical methods and modelling business management methods to successfully complete the course of studies. Competence in their problem-related application to questions at the interface of engineering/natural sciences and economics as well as clear and precise argumentation skills are also required. The aptitude procedure is regulated and explained in detail in the Program Specific Academic and Examination Regulations. After evaluation in the first stage, applicants are either immediately admitted or rejected, or their essay submitted with the application is used for evaluation, depending on the number of points achieved.

Depending on the technical subject chosen, the Master’s program can be completed entirely or partially in English. Therefore, a very good knowledge of English is a prerequisite for a successful application. These will be checked on receipt of the application. Graduates of the "English Track" of the TUM-BWL Bachelor's program have the opportunity to study in English until they obtain their Master’s degree.

3.3 Target figures

Since an aptitude assessment process is carried out to find suitable applicants for the interdisciplinary program, no exact target number can be stated. However, the program is basically designed for an annual beginner cohort of around 650 enrolled students. In the summer semester 2017 45 students (TUM-BWL) and in the winter semester 2017/18 417 students (MMT) started their studies in the relevant courses. Currently, the TUM School of Management
Management trains 55% of its students at Bachelor's level, 42% of its students at Master's level and 3% of its students in Executive Education level. For the year 2020, the faculty plans a distribution of 50% Bachelor, 42% Master and 8% Executive Education level.

4. Demand analysis

The skills of employees at the interface between management, engineering and the natural sciences are in great demand. In comparison with pure managers, engineers and natural scientists, these skills always represent a major competitive advantage on the labor market when positions that are characterized by the interaction between management and technical corporate divisions have to be filled. Job advertisements often require interdisciplinary qualification profiles, e.g. that of industrial engineer, and thus signal the great demand.

This is confirmed by industry-wide representatives of the corporate partner companies of the TUM School of Management. Mr. Dominik Asam, CFO of Infineon Technologies AG, for example, stressed in a meeting of the Advisory Board of the TUM School of Management on January 28, 2016, that the profile of a business manager with technical understanding, as it is generated at the TUM School of Management in the Master’s program Management and Technology (TUM-BWL), is extremely in demand on the job market. Further testimonials like Prof. Dr. Claus Hipp confirm that the students of the TUM School of Management, who are trained for positions at this interface, enjoy one of the best and most sought-after education in the German-speaking area. Most recently, Milagros Caiña Carreiro-Andree from the Board of Management of BMW AG expressed similarly positive opinions about the interface graduates of the Management and Technology (TUM-BWL) program at the TUM School of Management: The TUM School of Management graduates impress again and again. With their interdisciplinary skills at the interface between management and technology, they are perfectly tailored to the needs of the industry, says Mrs. Milagros Caiña Carreiro-Andree.

Representatives of the Career Center of the TUM School of Management, who are in regular contact with personnel managers, personnel consultancies, employees as well as the executive boards of partner companies of the TUM School of Management, also confirm that the TUM-BWL brand has established itself very strongly, especially in Southern Germany, and enjoys great popularity for the reasons mentioned above.

In addition to these individual opinions of top-class representatives from the business world, various employer surveys also confirm these statements. This can be seen, for example, in a large-scale company survey conducted by Wirtschaftswoche, in which 540 personnel managers from German companies were interviewed. The TUM School of Management is in 5th place there and has thus risen by 6 places compared to the previous year. In this ranking it is thus the best faculty at a Technical University in the field of "Business Administration".

At the same time, the 2015 graduate survey of the TUM School of Management underlines how attractive graduates of the predecessor courses TUM-BWL and TUM-WITEC are on the job market.

42.2% of the surveyed TUM-BWL and TUM-WITEC graduates of the 2015 cohort already had an employment contract before graduating, 90% of all respondents now work in an internationally active company. 78% of the graduates surveyed confirm that they work at the
interface between management and engineering / natural sciences. And 44% of the respondents even confirm that they have an employment in which they contribute to solutions to the major social challenges (Natural Resources, Energy/Climate, Mobility, Communication/Information, Infrastructure, Health & Nutrition).

Further, the opinion of the graduates themselves also speaks for the quality of the study programs: 83% of the TUM-WITEC and TUM-BWL graduates surveyed would take the same study course again.

The employability of TUM-BWL and TUM-WITEC graduates can therefore be rated as high and is further enhanced by the imparting of international management knowledge, experience in dealing with other cultures and the explicit promotion of English language skills for employment in internationally oriented or foreign companies.

In summary, it can be stated that companies and graduates of the previous master programs TUM-BWL and TUM-WITEC confirm the great competitive advantage of being able to “speak both languages”. The graduates of the successor study course Management and Technology (TUM-BWL) will be able to profit equally from the already established brand TUM-BWL, which is especially appreciated by HR managers in Southern Germany.

5. Competitive analysis

5.1 External

In German-speaking countries, a large number of different Master’s programs is offered, focusing on education at the interface of management, engineering and natural sciences. The following table gives an overview of the ratios of engineering and management sciences taught.

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<tr>
<th>University</th>
<th>Ratio</th>
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<tr>
<td></td>
<td>ING</td>
</tr>
<tr>
<td>FAU Erlangen</td>
<td>60%</td>
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<tr>
<td>Uni Paderborn</td>
<td>65%</td>
</tr>
<tr>
<td>TU Kaiserslautern</td>
<td>50%</td>
</tr>
<tr>
<td>RWTH Aachen</td>
<td>50%</td>
</tr>
<tr>
<td>KIT</td>
<td>50%</td>
</tr>
<tr>
<td>TU Dresden</td>
<td>50%</td>
</tr>
<tr>
<td>TU Berlin</td>
<td>45%</td>
</tr>
<tr>
<td>TU Dortmund</td>
<td>70%</td>
</tr>
<tr>
<td>TU Braunschweig</td>
<td>50%</td>
</tr>
<tr>
<td>University Stuttgart</td>
<td>30%</td>
</tr>
</tbody>
</table>
The presented Master's degree programs focus on programs with particular interest in the engineering education. For example, 50% or more of the courses offered are from an engineering or natural science discipline; the remainder are from management. In the Master's program in Management and Technology (TUM-BWL), students generally take between 50% and 75% business management modules. Only the University of Stuttgart offers a similar course of study in technically oriented management.

A further important difference between the Master’s program Management and Technology (TUM-BWL) and the above-mentioned programs in Industrial Engineering and Management lies in the engineering and scientific orientation of the programs. Most industrial engineering degree programs focus on mechanical engineering, while students of the Management and Technology (TUM-BWL) degree program can choose between chemistry, electrical engineering and information technology, informatics, mechanical engineering, computer engineering and industrial engineering. The well-founded business education combined with a wide range of technical and scientific specialisations thus forms the unique selling point of the Management and Technology (TUM-BWL) degree program.

Furthermore, the Master's program Management and Technology (TUM-BWL) distinguishes itself from the above mentioned programs by its great freedom of choice. This enables students to create and sharpen their own individual profiles.

In a European comparison, the program has a unique selling point. There is no comparable degree program in Europe with similar freedom of choice and diversity of profile formation. In addition, as a rule there is no connection to the range of subjects offered by technical faculties.

5.2 Internal

The fact that a large number of current applicants for the Master’s program in Management and Technology (TUM-BWL) comes from the Bachelor’s program of the same name indicates that the Master’s program offered is very attractive for consecutive studies and that there are hardly any internal alternatives. The Master “Development, Production and Management in Mechanical Engineering”, offered under the leadership of the Faculty of Mechanical Engineering, comes closest to the program in terms of content, but is oriented solely to the technical discipline of Mechanical Engineering and, unlike the Management and Technology (TUM-BWL) program, also focuses on it. In addition, the degree programs in Mechanical Engineering and Management do not allow access for graduates of purely business degree programs. Internally, this option represents a unique selling point.

6. Structure of the degree

The Master in Management and Technology (TUM-BWL) usually lasts four semesters. The knowledge, skills and competences listed in the qualification profile are taught in four sections as described below. The following figure gives an initial overview.
In the area of Management ("Specialization in Management"), students have access to management modules from the following Departments:

- Innovation & Entrepreneurship
- Marketing, Strategy & Leadership
- Operations & Supply Chain Management
- Finance & Accounting
- Economics & Policy
- Energy Markets
- Life Sciences & Management

All students choose a field of competence upon the beginning of their studies and complete elective modules amounting to 30 ECTS within this specialization. In the elective modules, which have the character of seminars or lectures, the students are educated and deepened in the subject knowledge and methodical competences of the respective faculty, which they already know fundamentally from their Bachelor’s program in management. All students are obliged to complete at least one module of 6 ECTS as an "Advanced Seminar" of the respective specialization. In this way it is ensured that all students acquire advanced knowledge in scientific work. The completion of this module is recommended as a preparation for the Master’s thesis.

In the field of technology ("Specialization in Engineering/Natural Science") there are different options depending on the previous knowledge of the students in the field of engineering and natural sciences. Students who have already completed a Bachelor’s degree at the interface between management and technology have the opportunity to further deepen their technical subject already studied in the Bachelor’s degree course. The following specializations are available for this purpose, which generally require previous knowledge of 30 ECTS in subject-specific modules:
- Mechanical engineering “major”
- Chemistry “major”
- Electrical Engineering and Information Technology “major”
- Informatics “major”
- Computer Engineering “major”

The above-mentioned specializations “major” each consist of 30 ECTS elective modules. This enables students to continue their technological education, tailored to the individual’s previous knowledge. The students complete the same lectures, exercises and internships that are offered in the undergraduate and graduate study programs of the respective faculties of the TUM. In this way the students get to know the vocabulary, the ways of thinking and the solutions of the respective discipline and can use them themselves. In this way, students of the Master in Management and Technology (TUM-BWL) not only strengthen their skills and social competences in dealing with specialists from the chosen field of technology, but also deepen their specialist knowledge in the chosen field.

Students who have not acquired any knowledge in the field of natural sciences or engineering within the scope of their Bachelor’s program, or students who would like to acquire competences in a new technical field, have the following options:

- Mechanical Engineering “minor”
- Chemistry “minor”
- Electrical Engineering and Information Technology “minor”
- Informatics “minor”
- Computer Engineering “minor”
- Industrial Engineering “minor”

The mentioned specializations "minor" consist of up to 30 ECTS of elective modules. Students acquire a well-grounded basic knowledge in each of the five technology subjects offered. In order to ensure the connectivity of the knowledge as well as the understanding of the respective technical language, it is necessary in some specialization directions to complete basic compulsory modules of up to 18 ECTS at the beginning (chemistry, electrical engineering and information technology). These are again the original lectures, exercises and internships offered to the students of the respective subject in the undergraduate courses of engineering or natural sciences. Since the students learn these basics together with the students of the undergraduate course, they simultaneously engage in a completely different communication and solution culture in their respective engineering or natural science subject. In a generic sense, the technology subject fulfills the function of ensuring that graduates of the Management and Technology (TUM-BWL) degree program can interact with representatives of the respective technology discipline on their subjects.

In the area of the Electives (Electives in Management and Technology, at the same time mobility window in the 3rd semester) the students have the possibility to deepen existing knowledge, to acquire new knowledge and to extend their own competences, or to transfer theoretical knowledge into practice in the form of a project study.

The following options of the Electives are regarded as ideal-typical:

- The Electives in Management and Technology can be used to select further modules within the framework of the management specialization. This option offers the
possibility of profiling one in competition with special master programs in management, as they are currently conquering the international market.

- The Electives in Management and Technology can be used to select further courses of engineering or scientific specialization at basic or advanced level. This option offers the possibility of sharpening one's profile in competition with classical industrial engineers, who normally have more technical skills in their studies.

- The Electives in Management and Technology can be provided in freely selectable proportions both by modules from the management and technical disciplines. In this way, students broaden their knowledge according to their interests with a view to the interface between management and technology and shed light on this, for example, from the perspectives of different disciplines.

- The Electives in Management and Technology are suitable in the sense of a mobility window for the studying at foreign universities. The freedom of choice simplifies the recognition procedure for modules taken abroad. This option increases the attractiveness of a stay abroad in order to sharpen an international profile and to acquire knowledge in subject areas that are not the main focus of TUM. Such a study stay abroad also intensively sensitises students to intercultural issues and prepares them especially for work in international teams.

Since at least 6 credits must be earned in the 3rd semester through the compulsory module Advanced International Experience, it is ensured that students who cannot spend a whole semester abroad also gain a minimum of international experience. For these students, there are other opportunities to spend time abroad, such as completing a project course or a Master’s thesis abroad. In order to enable students to reflect on the contents of the module against the background of their own relevant international experience, a minimum stay of 60 calendar days abroad is required. The Advanced International Experience module is offered as an online course.

As part of the Electives, a project study course of 12 ECTS can be chosen. The project study course provides the opportunity to transfer theoretical knowledge into practical engineering and science related companies. This promotes analytical and solution-oriented thinking and acting. At the same time, social skills are acquired, such as the ability to work in a team, as the project study is completed in a group.

The 24 ECTS in the area of Electives in Management and Technology are designed as elective subjects in the sense of freedom of choice and individual profile building and can offer all common course formats.

The Master’s program finishes in the 4th semester by the Master’s thesis, which has to be completed within six months. The guided in-depth study with a scientific question leads to a future self-responsible ability to conduct research.

**Offer of the double degree**

Double Degree students, who start at the TUM, complete 30 ECTS in their management focus and 30 ECTS in their technology focus in the 1st & 2nd semester. In the 3rd & 4th semester they take 40 ECTS in the "MSc. II - Master of Science in Management" at HEC and either the 15 ECTS in the "Certificate Program" at HEC or complete an internship. A 15 week internship is completed by students within the Double Degrees Program. In the 5th semester students write their Master's Thesis (30 ECTS) at the TUM.
Double Degree students who start at HEC complete 60 ECTS in the 1st & 2nd semester at the "MSc. II - Master of Science in Management" and a 15 week internship. In the 3rd, 4th, & 5th semesters they each take 30 ECTS in their management focus and 30 ECTS in their technology focus and write their Master’s Thesis (30 ECTS) at the TUM. In their 6th semester they complete another internship.

Since the declared aim of the Master’s program in Management and Technology (TUM-BWL) is to support students in the sense of self-competence in the area of taking personal responsibility, this program includes a high degree of freedom of choice: the specialisation in management, the technical subject as well as the Electives can be chosen and combined according to preferences and interests. Apart from the Master’s thesis, which is planned for the fourth semester, this also applies to the chronological sequence of the three other content blocks of the program. Through their individual choice of course and the possibility of studying the entire program in English, the students themselves also decide to what extent and in which subject areas they acquire subject-specific, business fluent English skills.

In order to ensure the best possible studyability for students despite the wide range of options, the TUM School of Management has drawn up corresponding curricula for five exemplary combinations (see appendix). If this ideal timetable is not feasible for every student, he or she will be able to adjust his or her curriculum to suit individual needs in the elective module area in order to be able to acquire the 30 credits per semester - without impairing the logical structure of the course of study. The Department of Undergraduate and Postgraduate Education offers weekly consultation hours as well as regular information events and webinars for the individual planning of the studies and the planning of a semester abroad. In addition, the Buddy Program organized by the department enables fresmen or international students to get support of a student in a higher semester in the beginning of their studies at TUM School of Management.

Since the Master in Management and Technology (TUM-BWL) is a combination of the two Master’s programs TUM-BWL and TUM-WITEC, the modules of the predecessor programs can be found in the Master’s program in Management and Technology (TUM-BWL) and, as in the predecessor programs, can be offered without overlap.

7. Organizational affiliation and responsibilities

The Master’s program Management and Technology (TUM-BWL) is offered by the TUM School of Management (WI).

The courses offered within the individual components of the study programme are provided by the faculties of the TUM as specified in table 2.

Responsible for the Master's program Management and Technology (TUM-BWL) are the Dean of Studies, the Academic Program Director, the Master's Examination Board and the Aptitude Commission of the TUM School of Management.
### Table 2: Departments at TUM – Competences for degree program components

<table>
<thead>
<tr>
<th>TUM Departments Components</th>
<th>TUM School of Management</th>
<th>Engineering- / Natural science TUM faculties</th>
</tr>
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<tbody>
<tr>
<td><strong>Specialization in Management</strong></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td><strong>Specialization in Engineering / Natural Science</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry major &amp; minor</td>
<td></td>
<td>Department of Chemistry</td>
</tr>
<tr>
<td>Electrical Engineering and Information Technology major &amp; minor</td>
<td></td>
<td>Department of Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Informatics major &amp; minor</td>
<td></td>
<td>Department of Informatics</td>
</tr>
<tr>
<td>Mechanical Engineering major &amp; minor</td>
<td></td>
<td>Department of Mechanical Engineering</td>
</tr>
<tr>
<td>Computer Engineering major &amp; minor</td>
<td></td>
<td>Department of Electrical and Computer Engineering</td>
</tr>
<tr>
<td>Industrial Engineering minor</td>
<td>X</td>
<td>Department of Mathematics/ Informatics</td>
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<tr>
<td><strong>Electives in Management and Technology</strong></td>
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<td></td>
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<tr>
<td>Management Electives</td>
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</tr>
<tr>
<td>Chemistry major &amp; minor</td>
<td></td>
<td>Department of Chemistry</td>
</tr>
<tr>
<td>Electrical Engineering and Information Technology major &amp; minor</td>
<td></td>
<td>Department of Electrical and Computer Engineering</td>
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<tr>
<td>Informatics major &amp; minor</td>
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<td>Department of Informatics</td>
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<tr>
<td>Mechanical engineering major &amp; minor</td>
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<tr>
<td>Computer Engineering major &amp; minor</td>
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<td>Department of Electrical and Computer Engineering/ Informatics</td>
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<tr>
<td>Industrial Engineering minor</td>
<td>X</td>
<td>Department of Mathematics/ Informatics</td>
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<tr>
<td>Project studies</td>
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</table>
Program responsibility and coordination are the responsibility of the Dean of Studies and the Academic Program Director of the TUM School of Management responsible for the program. The TUM School of Management's Master Examination Board is responsible for the clarification of examination matters and the recognition of examinations. The Aptitude Commission is responsible for the proper execution of the aptitude assessment procedure. The administration of the TUM School of Management, in particular the departments Admissions & Program Coordination, Student Affairs & International Programs, Quality Management and Communications, performs central administrative tasks in coordination with the Dean of Studies, the Academic Program Director and the responsible committees and commissions. The tasks are distributed as shown in table 3.

The organization of the Double Degree Program is jointly supported by the administration of the TUM School of Management and its partner HEC Paris.

The Student Affairs and International Programs department supports students during their stay abroad.

Information about the program is published on the website of the TUM School of Management (www.wi.tum.de) under the category Academic Programs.
3: Distribution of the tasks among the staff of the corresponding departments of the administration of the TUM School of Management

<table>
<thead>
<tr>
<th>Admissions &amp; Program Coordination</th>
<th>Student Affairs &amp; International Programs</th>
<th>Quality Management</th>
<th>Communications</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Student selection (organisation of application and assessment procedures)</td>
<td>• Program management (incl. information events)</td>
<td>• Quality management (incl. evaluation of teaching and learning)</td>
<td>• Career Development: introducing the study program to HR of forms</td>
</tr>
<tr>
<td>• Course planning (incl. creation of course schedules)</td>
<td>• Student counseling (incl. orientation and mentoring)</td>
<td></td>
<td>• Career Service</td>
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<tr>
<td>• Coordination of imports and exports in teaching</td>
<td>• Study abroad (incl. coordination / assigning study places abroad)</td>
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<td>• Websites</td>
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<tr>
<td>• Examination planning</td>
<td></td>
<td></td>
<td>• Degree program flyer</td>
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<tr>
<td>• Adjusting and updating TUMonline (grades, lectures etc.)</td>
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<tr>
<td>• Grade management (incl. transcripts, final thesis, graduation documents, certificates and rankings)</td>
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<td></td>
<td></td>
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<tr>
<td>• TUMonline input (incl. grade record and validation)</td>
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<td>• Organization Examination committees</td>
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