Study and Examination Regulations for the Master's Program in Industrial Engineering and Management at Technische Universität Berlin

from June 17, 2015
changed: April 25, 2018
last updated April 22, 2020

This version is an unofficial *reading version* in which changes and corrections have been included up to the date given above. The text published in the Official Notifications of Technische Universität Berlin continues to be the authoritative and legally binding version. You can find the latest version via `www.gkwi.tu-berlin.de`

Contents

Technische Universität Berlin's Joint Commission for Industrial Engineering (GKWi) passed the following study and examination regulations for the Master's degree program Industrial Engineering and Management on June 17, 2015[1] according to Sec. 71 (1) no. 1 in conjunction with Sec. 74 of the Berlin Higher Education Act (Berliner Hochschulgesetz - BerlHG) in the version from July 26, 2011 (Berlin Law Gazette p. 378), last amended by Art. 6 of the Act from February 2, 2018 (Berlin Law Gazette p. 160), and amended them on April 25, 2018[2]:

I General Section

Sec. 1 Area of Applicability

These study and examination regulations set down the objectives and structure of studies as well as the requirements for and execution of examinations in the Master's degree program Industrial Engineering and Management. It supplements the Regulations on General Procedures for Studies and Examinations at the Technische Universität Berlin (AllgStuPO) with regulations specific to the degree program.

Sec. 2 Entry into Force/Going out of Force

(1) These study and examination regulations enter into force for the summer semester 2016.

(2) The study regulations for the Master's program Industrial Engineering and Management from July 14, 2010 (TU Official Notifications p. 333) and the examination regulations for the Master's program Industrial Engineering and Management from May 5, 2010 (TU Official Notifications p. 326) go out of force when these examination regulations enter into force.

(3) Beyond Sec. 2 (1), these regulations also apply to all students already enrolled in the Master's program Industrial Engineering and Management at the Technische Universität Berlin. Coursework and examinations already completed will be fully recognized. Students who are already enrolled can agree on an individual study plan with the examination committee.

II Study Objectives and Structure

Sec. 3 Qualification Objectives, Contents, and Professional Fields

(1) In their degree program, Industrial Engineering and Management students primarily work on drafting, planning, introducing, and operating socio-technical systems. This includes the ability to forecast and evaluate the behaviors and results of these systems. The graduates are able to work independently on problems, evaluate research positions and results competently and thoroughly, applying these positions and results in their own research work. For this, the program combines mathematics, principles of the natural sciences, economic sciences, and engineering. A special role is given to the interdisciplinary subjects and the consideration of transdisciplinary aspects in individual subject areas. The Master's program in Industrial Engineering and Management at the Technische Universität Berlin is done simultaneously, that is, the various disciplines are offered at the same time, their content is linked, and the methods are integrated. Some courses are offered in German, others in English. One key aspiration of the educational concept is to rely primarily on the courses of the respective subject programs and to fulfill the same requirements as the students in those programs. Due to the Technische Universität Berlin's wide range of courses, the economic and social scientific education can be combined with one of the following engineering majors:

- Civil Engineering
- Chemistry and Process Engineering
- Electrical Engineering
- Energy and Resources

[1] confirmed by TU Berlin's Executive Committee on September 29, 2015; AMBl. 37/2015, p. 350-360 & AMBl. 8/2016, p. 53
[2] confirmed by TU Berlin's Executive Committee on July 29, 2018; AMBl. 32/2018, p. 332-333

- Healthcare Technology
- Information and Communication Systems
- Logistics
- Mechanical Engineering
- Transportation Engineering

(2) The educational concept for Industrial Engineering and Management at the Technische Universität Berlin can be described as follows:

- The scientific education in the degree program Industrial Engineering and Management conveys deep theoretical and practical knowledge and skills necessary for students to have successful professional careers; by practicing scientific thinking, students strengthen their judgment and increase their awareness for the responsibility of the individual in society. These goals are achieved by a transdisciplinary education that takes as its starting point socially, economically, and technically relevant questions both in theory and in practice.
- One characteristic of the degree program in Industrial Engineering and Management is the core area of the integration subjects. These include scientific methods and approaches with the objective of comprehensively integrating transdisciplinary questions. The focus is on understanding and combining the language and thinking of various disciplines from engineering and economic sciences. The integration modules, in which the interdependencies of engineering and economics are shown and taught, shape the integrative character of the Industrial Engineering and Management program and implement the program's transdisciplinary aspect.
- In the economics part of the program, students of Industrial Engineering and Management obtain more extensive professional qualifications. In the Master's program, the time and content restrictions force students to concentrate on the essential subjects without generally limiting the depth and breadth of the material.
- In the engineering part of the program, the focus is on a more in-depth education in the natural scientific disciplines as well as in the core subjects of the technical part of the major chosen. In regard to the necessary limitation of the material, this means that the foundational knowledge in the Master's program can only be expanded in an illustrative way. The students of Industrial Engineering and Management therefore get to know methods and ways of thinking and working in engineering and are enabled to cooperate with the respective experts on the basis of their own judgment on engineering problems and solutions to those problems.
- Overall, in this approach there is a balanced ratio of integration, economic, and engineering subjects. In the Master's program it allows for many elective possibilities, individual concentrations and specializations, as can be seen in the comprehensive catalogs of semi-elective subjects. What is decisive is that an in-depth qualification is obtained in the selected areas.

(3) The theory part of the program includes conveying advanced laws and relationships of the relevant scientific disciplines, guiding students toward logical, analytical, and critical thinking, and teaching the ability to independently work on new problems and tasks from a critical perspective.

(4) The practical part of the program includes gaining knowledge about structures, processes, regulations, etc. in the desired professional field; further implementing theory in practice; developing the ability to work out sensible solutions with incomplete information and under time pressure; increasing encouragement of teamwork; and internalizing and applying cooperative and constructive conflict-solving behavior.

(5) Industrial engineers are active in nearly all areas of the private sector, in particular in the industrial sector, trade, and the service sector. They also work in public management. The breadth of the possible careers corresponds to that of the education program. Typical career fields include:

- Controlling/Accounting
- Manufacturing/Production
- Financing/Investment
- Research/Development
- Information and Communication Technology
- Innovation Management
- Teaching and Research/Academics
- Logistics/Purchasing

- Marketing and Sales
- Organization and Business Planning
- Human Resources
- Project Management
- Resource Management
- Consulting Companies
- Management

These professional activities also offer many chances for later entrepreneurship, e.g. in consulting, planning offices, auditing, sales, or as independent contractors or a contractor for a production or service operation. With their transdisciplinary education, industrial engineers are also trained for work in scientific research. Past experience shows that the portion of graduates from the Master's program who go on to do doctorates or pursue other research activities is higher than average.

(6) The Master's degree confirms that the graduates have both deep and extensive knowledge of their subject area, that they can continue to develop this knowledge in a scientifically and methodologically well-founded manner, and that they have specialized problem-solving abilities using knowledge from other areas that can lead to new insights and developments. They are characterized by strategic, critical thinking and action in regard to social responsibility and sustainable development.

(7) The Master's program in Industrial Engineering and Management is part of a consecutive offer of studies made up of a Bachelor's program in Industrial Engineering and Management and the research-focused Master's program in Industrial Engineering and Management.

Sec. 4 Start of Studies, Regular Period of Study, and Scope of Studies

(1) Studies start in the winter and summer semester.

(2) The regular period of study is four semesters. The scope of the requirements for the degree program is calculated such that students who exclusively focus on their studies can complete the program in this time including the necessary examinations.

Sec. 5 Structure of Studies

(1) Students have the right to structure their studies individually. However, they are required to adhere to the provisions of these study and examination regulations. An example for the succession of modules is shown in the sample study schedule in Annex 2 of these regulations. This does not affect requirements arising from the definition of subject prerequisites for modules.

(2) The Master's program includes 120 credit points. Modules from the following module groups must be taken:

a) Integration area: Semi-elective modules totaling at least 18 credit points,

b) Economic sciences: Compulsory and semi-elective modules totaling at least 30 credit points, of which at least twelve credit points are taken in business, six in economics, and six in law,

c) Engineering: Compulsory and semi-elective modules totaling at least 30 credit points,

d) Elective area: Elective modules totaling a maximum of twelve credit points,

e) the non-graded industrial internship totaling six credit points (Sec. 5 (5)) and

f) the Master's thesis totaling 24 credit points (Sec. 9).

The allocation of individual modules to the module groups, the examination form, and the grading with credit points are set down in the module list (Annex 1).

(3) For engineering modules, students can choose among the engineering majors according to Sec. 3 (1). The selection of the engineering major is done at the latest when re-registering for the second subject-specific semester with the responsible office in the Central University Administration. When changing universities or entering for a career change

(Quereinsteiger), the selection is done by submitting a request for the recognition of coursework and examinations. At any time it is possible to change the engineering major as long as all modules already passed are the compulsory modules or can be part of the degree program even after changing the major according to Sec. 39 (5) AllgStuPO. Upon request, the examination committee makes decisions on exceptions. If a module examination was failed for a final time, it is not possible to change majors.

(4) The modules in the elective area serve to obtain additional subject-area, interdisciplinary, and professional skills and can be chosen from any courses offered at the Technische Universität Berlin, other universities and higher education institutions equal to universities in the German Higher Education Framework Act's area of application or accredited higher education institutions and universities in other countries. It is recommended that students choose from the interdisciplinary courses. The modules that can be chosen also include modules for learning foreign languages.

(5) A professional internship lasting at least twelve weeks must be completed as part of the curriculum. The examination committee is responsible for recognizing the professional internship. Details are set down in the internship regulations (Annex 3).

(6) To promote foreign language and intercultural competence as well as prepare students for the increasingly international professional environment of industrial engineers, an integrated study abroad program is highly recommended. This study abroad program should be done in the second and third subject-specific semesters. Modules that were completed during the integrated study abroad program will be recognized in addition to the modules included in the module list for the semi-elective areas as long as they correspond to the qualification objectives of the respective area.

(7) Besides conveying subject-area skills in a unique way, internships abroad give insights into the communicative, social, and cultural circumstances of professional life in other countries and are therefore strongly recommended.

(8) In the framework of its cooperation agreements with other universities (e.g. dual degree programs) or graduate programs, the Joint Commission for Industrial Engineering (GKWi) offers special training programs that require students to be admitted to this Master's program. If the course offers for the participants in this special training program can be completed entirely in English, then proof of German language proficiency does not need to be submitted for the admission requirements. The examination committee decides on this.

III Requirements for and Execution of Examinations

Sec. 6 Purpose of the Bachelor's Examination, Academic Degree

(1) The Master's examination determines whether a candidate has achieved the qualification goals according to Sec. 3.

(2) With the passed Master's examination, Technische Universität Berlin via GKWi awards the academic degree Master of Science (M.Sc.).

Sec. 7 Scope of the Master's Examination and Calculation of the Overall Grade

(1) The Master's examination is made up of the module examinations set down in the module list (Annex 1) and the Master's thesis (Sec. 9).

(2) The overall grade is calculated using all module grades according to the principles in Sec. 47 (6) AllgStuPO, whereby the module examinations in the module groups according to Sec. 5 (2) letter e and the worst module examinations in the module groups according to Sec. 5 (2) letters a to d totaling a maximum of 12 credit points are not considered. If grades are equal, the most recently completed module is not considered. Modules that are not graded or recognized as not graded are included as a priority in these credit points.

Sec. 8 Examination Forms

The examination forms are regulated in the respectively valid version of the AllgStuPO. Module examinations from the courses in other degree programs, faculties, or universities may be given in other forms than those described in the AllgStuPO. The provisions of the examination regulations and module descriptions of the department or institution holding the module apply.

Sec. 9 Master's Thesis

(1) The Master's thesis is typically completed in the fourth subject-specific semester. It totals 24 credit points and students have six months to complete it. If there is an important reason the student is not responsible for, the examination committee grants an extension for the duration of the reason. The maximum possible total extension amounts to six months. If the overall extensions exceed the maximum possible extension, the student can withdraw from the exam. The topic of the Master's thesis may be returned once within the first two months after it has been assigned.

(2) The requirement for registering for the Master's thesis is the successful completion of all compulsory modules in the degree program (Annex 1) and a total of at least 80 credit points. Upon request in justified exceptional cases, the examination committee may approve registration for the Master's thesis before the student has completed the requirements. If the Master's thesis is the final examination, the registration must be completed at the latest six months after the last module examination is passed.

(3) The topic of the Master's thesis should be related in content to one of the chosen modules (Sec. 5). It is recommended that the student write a short report on the type and scope of the thesis. Part of the Master's thesis is a colloquium. More detailed regulations can be found in the module description.

(4) If the Master's thesis is done in cooperation with an external institution, then the candidates must make sure there are no constraints not related to the topic, that competent supervision is available on-site, and that the reviewers have access to all information necessary to grade the thesis. Matters related to using resources, confidentiality, or the rights to the results of the work are to be clarified with agreements between the University and the external institution before approving the topic for the Master's thesis.

IV Annexes

Annex 1 – Module List

Name of Module	Scope (CP)	Exam Form	Grading
Integration Area	**min. 18**		
Semi-elective Modules	**18**		
According to the module lists published for each semester		S/M/P	Yes
Economic Sciences	**min. 30**		
Business Administration			
Semi-elective Modules	**min. 12**		
Energy and Resources - Management[3]	6	P	Yes
Global Logistics Management[4]	6	P	Yes
Healthcare System Management (MiG) - Industry[5]	6	P	Yes
Healthcare System Management (MiG) - Health Insurance and Service Providers[6]	6	P	Yes
According to the module lists published for each semester		S/M/P	Yes
Economics			
Semi-elective Modules	**min. 6**		
According to the module lists published for each semester		S/M/P	Yes
Law			
Semi-elective Modules	**min. 6**		
According to the module lists published for each semester		S/M/P	Yes
Engineering (one of the majors according to Sec. 3 (1))	**min. 30**		
Civil Engineering			
Compulsory Modules	**6**		
Structural Design II	6	S	Yes
Semi-elective Modules	**24**		
According to the module lists published for each semester		S/M/P	Yes
Chemistry and Process Engineering			
Compulsory Modules	**12**		
Process and Systems Engineering	12	P	Yes
Semi-elective Modules	**18**		
According to the module lists published for each semester		S/M/P	Yes
Electrical Engineering			
Semi-elective Modules	**30**		
According to the module lists published for each semester		S/M/P	Yes
Energy and Resources			
Compulsory Modules	**12**		
Principles of Energy and Resources	6	P	Yes
Energy and Resources - Technologies and Systems	6	P	Yes
Semi-elective Modules	**18**		
According to the module lists published for each semester		S/M/P	Yes
Healthcare Technology			
Compulsory Modules	**12**		
Introduction to Medical Technology	6	S	Yes
Principles of Medicine for Engineers	6	S	Yes
Semi-elective Modules	**18**		
According to the module lists published for each semester		S/M/P	Yes
Information and Communication Systems			
Semi-elective Modules	**30**		
According to the module lists published for each semester		S/M/P	Yes

[3] Compulsory module for students with the major Energy and Resources
[4] Compulsory module for students with the major Logistics
[5] Compulsory module for students with the major Healthcare Technology
[6] Compulsory module for students with the major Healthcare Technology

Name of Module	Scope (CP)	Exam Form	Grading
Logistics			
Compulsory Modules	**12**		
Logistics: Systems Design and Integration	6	P	Yes
Logistics: Technologies and Ddigital Processes	6	P	Yes
Semi-elective Modules	**18**		
According to the module lists published for each semester		S/M/P	Yes
Mechanical Engineering			
Compulsory Modules	**12**		
Factory Operations and Virtual Product Development	6	P	Yes
Production and Automation Engineering in Factory Operations	6	P	Yes
Semi-elective Modules	**18**		
According to the module lists published for each semester		S/M/P	Yes
Transportation Engineering			
Semi-elective Modules	**30**		
According to the module lists published for each semester		S/M/P	Yes
Elective Area	**min. 12**		
All modules from the area of application of the German Higher Education Framework Act		S/M/P	Yes
Industrial Internship	**6**		
According to Sec. 5 (5)		S/M/P	Yes
Master's Thesis	**24**		
Master's Thesis	24	-	Yes

Annex 2 – Sample Study Schedule

The sample study schedules are for full-time studies. If the student is studying part-time, they are urgently advised to work out an individual study schedule in an advising session with the subject advising service. The information is given in credit points (CP).

	Semester					
	1st 30 CP	Integration (6 CP)	Economic Sciences (12 CP)		Engineering Major (12 CP*)	
Mobil. Window	2nd 30 CP	Integration (6 CP)	Economic Sciences (12 CP)		Engineerig Major (12 CP*)	
	3rd 30 CP	Integration (6 CP)	Economic Sciences (6 CP)	Elective Area (6 CP)	Engineering Major (6 CP*)	Elecive Area (6 CP)
	4th 30 CP	Industrial Internship (6 CP)	Master's Thesis (24 CP)			

** Depending on the chosen engineering major, credit points can be moved to another semester.*

Starting Studies in the Winter Semester (WS)

Engineering Majors

		Mobil. Wind.		
Semester	**1st WS**	**2nd SS**	**3rd WS**	**4th SS**
Civil Engineering				
Structural Design II		6		
Semi-elective Modules	12	6	6	
Chemistry and Process Engineering				
Process and Systems Engineering		12		
Semi-elective Modules	12		6	
Electrical Engineering				
Semi-elective Modules	12	12	6	
Energy and Resources				
BA: Energy and Resources - Management		6		
Principles of Energy and Resources	6			
Energy and Resources - Technologies and Systems	6			
Semi-elective Modules		12	6	
Healthcare Technology				
BA: Healthcare System Management (MiG) - Industry		6		
BA: Healthcare System Management (MiG) - Health Insurance and Service Providers	6			
Introduction to Medical Technology	6			
Principles of Medicine for Engineers	3	3		
Semi-elective Modules		12	6	
Information and Communication Systems				
Semi-elective Modules	12	12	6	
Logistics				
BA: Global Logistics Management		6		
Logistics: Systems Design and Integration	6			
Logistics: Technologies and Ddigital Processes		6		
Semi-elective Modules	6	6	6	
Mechanical Engineering				
Factory Operations and Virtual Product Development	3	3		
Production and Automation Engineering in Factory Operations		6		

		Mobil. Wind.		
Semester	**1st WS**	**2nd SS**	**3rd WS**	**4th SS**
Semi-elective Modules	6	6	6	
Transportation Engineering				
Semi-elective Modules	12	12	6	

Starting Studies in the Summer Semester (SS)

Engineering Majors

		Mobil. Wind.		
Semester	**1st SS**	**2nd WS**	**3rd SS**	**4th WS**
Civil Engineering				
Structural Design II	6			
Semi-elective Modules	6	12	6	
Chemistry and Process Engineering				
Process and Systems Engineering	12			
Semi-elective Modules		12	6	
Electrical Engineering				
Semi-elective Modules	12	12	6	
Energy and Resources				
BA: Energy and Resources - Management	6			
Principles of Energy and Resources		6		
Energy and Resources - Technologies and Systems		6		
Semi-elective Modules	12		6	
Healthcare Technology				
BA: Healthcare System Management (MiG) - Industry			6	
BA: Healthcare System Management (MiG) - Health Insurance and Service Providers		6		
Introduction to Medical Technology		6		
Principles of Medicine for Engineers		3	3	
Semi-elective Modules	12		6	
Information and Communication Systems				
Semi-elective Modules	12	12	6	
Logistics				
BA: Global Logistics Management	6			
Logistics: Systems Design and Integration		6		
Logistics: Technologies and Ddigital Processes	6			
Semi-elective Modules	6	6	6	
Mechanical Engineering				
Factory Operations and Virtual Product Development	3	3		
Production and Automation Engineering in Factory Operations	6			
Semi-elective Modules	6	6	6	
Transportation Engineering				
Semi-elective Modules	12	12	6	

Annex 3 – Internship Regulations

Sec. 1 Introduction

(1) These internship regulations set down the provisions for the professional internship in the Master's program Industrial Engineering and Management at the Technische Universität Berlin.

(2) The practical work in an industrial company is an important condition for later professional work and is thus a key requirement for the Master's program Industrial Engineering and Management.

(3) Industry and business benefit from the students' practically oriented education in the Industrial Engineering and Management program. Students are to be supported during their training, and they are to be given wide-ranging and instructive internship tasks.

Sec. 2 Training Objectives and General Information

(1) The internship is to convey knowledge of technologies related to the study program and introduce students to business organizational problems in order to complement and deepen practical experiences gained in the Bachelor's internship and theoretical knowledge obtained in studies.

(2) Besides this, the interns should become familiar with the various technical areas of a company in terms of their tasks and working methods as well as the ways in which they interact; they should also gain insights into the individual and social problems of the working world. These are particularly important for determining their own social location and cannot be imparted by the university. The insights and experiences gained during the internship make up an important foundation for understanding the contents of the study program and deepen the theoretical knowledge with practical application.

Sec. 3 Time Requirements

(1) The total duration of the internship in the Master's program is at least 12 weeks with weekly working hours of at least 35 hours. Proof of completion of an internship according to Sec. 5 (5) of the study and examination regulations is a requirement for successfully completing the Master's program Industrial Engineering and Management. It is also recommended that students complete additional internships.

(2) Splitting the internship to a maximum of two different companies is possible, whereby in this case at least four weeks must be completed in each company.

(3) Because the required internship time is so short, vacation and participation in training at vocational colleges during the internship will not be counted as internship time. Working time missed due to illness or other circumstances must be made up.

(4) The intern is responsible for ensuring that all required documents are submitted as early as possible so that the internship can be recognized on time.

Sec. 4 Content

(1) The internship may be done in a business or a technical area. Depending on the chosen major, the internships are based on the internship plans listed in Sec. 7.

(2) Students may individually structure their internship within the fields of activity listed in the respective internship plan.

Sec. 5 Internship Spot

(1) The interns should look for an internship spot on their own initiative. The content and organizational preparation of the internship is generally the responsibility of the company.

(2) The internship company should be a production or service company from the industrial sector, a non-university research institution, a government agency, or a non-governmental organization. Work at a university or higher

education institution in the context of university projects or initiatives cannot be recognized. The internships can be done in part or in whole either in Germany or abroad.

(3) Information on recognized training centers can be obtained from the local Chamber of Industry and Commerce. A student may request that the examination committee make a decision on the suitability of a particular company.

Sec. 6 Recognition of Internship

(1) The examination committee is responsible for recognizing the professional internship. Requests for recognition of an internship are to be submitted to the examination committee.

(2) After the entire internship is completed, the student must submit a request for recognition. The recognition form and internship certificate must be turned in to the examination committee. The documents should be submitted within six months of the conclusion of the internship. For internships or other similar activities (Sec. 6 (7)) done before starting studies, the corresponding documents should be submitted within the first two semesters.

(3) An internship certificate from the training center is to be submitted that includes the following information:

a) Training center and contact information for the internship director,

b) Intern's surname, first name, and date and place of birth,

c) Start and end of internship,

d) Exact information on days absent even if no days were missed,

e) Description of the tasks according to area, type, and duration, and

f) Confirmation of the reflection on the tasks and what was learned within the training center with a written report or discussion with the internship director.

(4) The examination committee decides on the extent to which the internship corresponds to the internship regulations and whether it can be recognized as an internship for the program. It can also require additional internship weeks if the internship certificate does not show that certain parts of the internship were carried out sufficiently.

(5) If an internship is recognized, the examination committee reports this to the responsible office in the Central University Administration.

(6) Internships or activities done elsewhere will be recognized in full as long as they fulfill the requirements of these internship regulations in the case of

a) changes in majors or degree programs,

b) work-study activities, and

c) professional activity.

(7) Students who cannot adhere to the internship regulations for exceptional reasons must request a change in the structure of their internship from the examination committee and submit any documentation necessary.

Sec. 7 Internship Plans

(1) Major Civil Engineering: The internship may be done in technical offices of construction companies, engineering offices, planning offices, or building authorities. Examples include the following fields:

a) Structure planning: Assisting with draft designs, data processing applications, working on constructive details, creating plans, etc.

b) Construction planning: Planning construction processes, scheduling, creating specifications, tender procedures, calculations, etc.

c) Construction and construction project completion: Work at the construction site, use of equipment and personnel, construction supervision, building inspection, quantity determination, surveying, billing, etc.

d) Construction logistics: Planning, coordinating, and executing construction-related logistics for construction services

e) Expert reports in the area of construction

(2) Major Chemistry and Process Engineering: The internship can be done in the chemical industry, the pharmaceutical industry, or in a process engineering company (power plants, breweries, food manufacturers, etc.). Examples include the following fields:

a) Chemical production or process development

b) Research and development in the area of technical chemistrye

c) Profitability analysis for chemical processes:

d) Planning, setting up, and starting operations for new plants

e) Repairs, construction, and assembly in the area of technical chemistry

f) Environmental protection and hazardous materials

g) Waste disposal and cleaning

h) Technical operational monitoring: Use of process computer, material balancing, process and regulation engineering, etc.

i) Material flow and logistics

j) Operational use of modern information and communication technology methods and procedures, IT systems, programming

(3) Major Electrical Engineering: The internship can be done in companies in the electrical industry. As examples, the following fields in the areas of plant, operations, production, device, information, telecommunication, and wireless technology are listed:

a) Getting to know the entire production process

b) Work preparation, production planning and control

c) Planning, setting up, and starting operations for new machines, plants, or information and communication systems

d) Research, development, construction, and trials in the area of electrical engineering

e) Testing, documenting, and modifying machines, plants, or information and communication systems

f) Automated systems

g) Operational use of modern information and communication technology methods and procedures, IT systems, programming

h) Planning and controlling logistical processes or technologies

i) Engineering services in the area of electrical engineering

j) Energy management in operations

k) Maintenance and repairs

(4) Major Energy and Resources: The internship can be done in industrial and service companies in the energy and utility industries and in plant engineering. Examples include the following fields:

a) Getting to know the entire production process

b) Work preparation, production planning and control

c) Development, planning, construction, and trials in the energy, utility, and raw materials industry and in plant engineering

d) Testing, documenting, and modifying machine and plant technology and energy systems

e) Plant and production planning

f) Operational use of modern information and communication technology methods and procedures, IT systems, programming

g) Preliminary drafting and construction drafting for technical energy and environmental plants

h) Running and evaluating simulations

i) Planning and controlling processes or technologies

j) Engineering services in the energy, utility, and raw materials industry

k) Maintenance and repairs of plants (if not already done in the pre-study internship)

l) Environmentally-friendly plant construction and operation

(5) Major Healthcare Technology: The internship can be done in companies in the medical technology industry, in the medical technology departments of large clinics, in government agencies and expert report agencies active in the area of medical technology, and in large research centers for medical technology. Examples include the following fields:

a) Medical technology industry: Construction and process organization of companies in medical technology; development of processes, devices, and medical technology systems; evaluation, testing, and assessment of processes and devices; quality management for products; planning and controlling logistical processes or technologies; engineering services in the area of electrical engineering and mechanics; application; cooperation with medical and medical technology research; consulting and training; marketing and sales

b) Clinics: Planning, setting up, operating, and maintaining medical technology devices; measuring, evaluating, and conducting error analysis for medical technology devices, systems, or connected information and communication systems; metrological recording, evaluating, and analyzing of biosignals and imaging; developing hardware, software, or methods in the area of medical technology; quality management and assurance measures

c) Medical technology research: Foundational research (experiment design, data analysis, drafting and carrying out scientific studies), clinical research (developing new processes and devices for diagnostics, therapy, and rehabilitation)

d) Government agencies and expert organizations: authoritative tasks to monitor the implementation of EU medical product guidelines / the German Medical Products Act (with the BMG or BfArM), risk analysis / vigilance system for error messages (with BfArM), certification (reduced / comprehensive certification, product verification, physical product evaluation, product dosage evaluation with “notified bodies”)

(6) Major Information and Communication Systems: The internship can be done in industrial, trade, and service companies for data processing and business functions, telecommunications and wireless technology, or multimedia (consulting companies, planning offices, etc.). As examples, the following fields in the areas of computer systems, landlines, wireless networks, end devices, and security systems are listed:

a) Getting to know the entire production process

b) Work preparation, production planning and control

c) Planning, configuring, programming, and implementing standard and individual software and systems with information and communication technology under consideration of work processes, data flows, and interfaces with complex system solutions: Project planning, project implementation, and order processing, project monitoring and quality assurance, determining specific requirements for operational performance processes and the possibilities for using information and communication systems; analyzing business processes and transforming them into information and communication solutions; determining, understanding, assessing possible solutions and selecting from typical market systems the information and communication technology as well as operating systems, applications, and software components with consideration of their area of use, scope of performance, and economic efficiency according to the client’s needs

d) Testing, documenting, and modifying hardware and software as well as modern information and communication technology methods and processes

e) Research, development, construction, and trials in the area of information and communication systems

f) Maintenance and repairs (if not already done in the pre-study internship)

g) Planning and controlling logistical processes or technologies

h) Engineering services in the area of information and communication systems

i) Creating applications in a macro or programming language

j) Drafting database structures under consideration of data models

k) Conceptualizing and realizing e-business applications

(7) Major Logistics: The internship can be done in industrial, trade, and logistics service companies as well as in software and engineering service companies in the area of logistics. Examples include the following fields:

a) Getting to know the production, logistics, or customer order process

b) Logistics planning (e.g. purchasing and distribution planning, inventory management, transport planning), sales planning (e.g. sales and operations planning, category management), supply chain management, production planning and control

c) Sales planning and order management in service companies (e.g. creating a quote, tender management, key account management, project management, launch management)

d) Development and planning as well as construction and trials in the area of transport and storage technologies, carriers, and transportation technologies

e) Planning and layout of logistics infrastructure (e.g. plant planning, mounting planning, warehouse planning)

f) Operational use of modern information and communication technology methods and procedures, IT systems, programming

g) Conceptualizing, developing, or using modern information and communication technologies in logistics (e.g. warehouse management systems, advanced planning systems, simulation software, telematics solutions, auto-ID technologies)

(8) Major Mechanical Engineering: The internship can be done in industrial companies in the area of mechanical engineering. Examples include the following fields:

a) Getting to know the entire production process

b) Work preparation, production planning and control

c) Development, planning, construction, and trials in the area of mechanical engineering

d) Testing, documenting, and modifying machine and plant technology

e) Preliminary drafting and construction drafting for mechanical equipment plants

f) Plant and factory planning

g) Running and evaluating simulations

h) Operational use of modern information and communication technology methods and procedures, IT systems, programming

i) Planning and controlling logistical processes or technologies

j) Engineering services in the area of mechanical engineering

k) Maintenance and repairs of vehicles and plants

(9) Major Transportation Engineering: The internship can be done in transport, transport technology, or transport planning companies or in expert public agencies. Examples include the following fields:

a) Getting to know the entire production process

b) Work preparation, production planning and control

c) Development, planning, construction, and trials in the area of transportation technology or a transport-related engineering construction site

d) Testing, documenting, and modifying transport technologies and facilities

e) Planning in land, air, or sea transport

f) Preliminary draft and construction draft for transport facilities

g) Organization and operation of transport companies

h) Transport management and control

i) Construction site activity in concrete construction, earth construction, etc. for transport routes and facilities

j) Transport planning and organization, planning and controlling logistical processes or technologies

k) Maintenance and repairs of transport methods and facilities