The officially published GERMAN text alone has binding force

Academic and Examination Regulations for the Bachelor's Degree Program Aerospace at the Technical University of Munich

Dated 6 November 2023

In accordance with Art. 9 Sentence 1 in conjunction with Art. 80(1) Sentence 1 and Art. 84(2) Sentence 1 of the Bavarian Higher Education Innovation Act [Hochschulinnovationsgesetzes (BayHIG)], the Technical University of Munich issues the following Regulations:

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I. General Provisions

§ 34
Applicability, Academic Titles, Related Degree Programs

(1) [1]These Academic and Examination Regulations for the Bachelor's Degree Program Aerospace (FPSO) complement the General Academic and Examination Regulations for bachelor's and master's programs at the Technical University of Munich (APSO) dated 18 March 2011 as amended. [2]The APSO has precedence.

(2) [1]Upon successful completion of the bachelor's examination, the degree "Bachelor of Science" ("B.Sc.") is awarded. [2]The academic title may also be used with the name of the university "(TUM)".

(3) [1]There is no degree program related to the Bachelor's Degree Aerospace at the Technical University of Munich. [2]If a student transfers from another university to the Technical University of Munich, the examination board in charge will decide on the basis of the examination regulations of that other university if the programs are related.

§ 35
Commencement of Studies, Standard Duration of Study, ECTS

(1) Commencement of studies for the Bachelor's Degree Program Aerospace is governed by § 5 of the APSO.

(2) [1]The number of credits in required and elective subjects needed to obtain the bachelor's degree is 168 credits (119 SWS/weekly hours per semester). [2]Students will have a maximum of nine weeks (12 credits) to complete their bachelor's thesis in accordance with § 46. [3]The number of coursework units and examinations in required and elective subjects to be completed in the Bachelor's Degree Program Aerospace according to Appendix 1 is a minimum of 180 credits. [4]The standard duration of study for the bachelor's program is a total of six semesters.

§ 36
Eligibility Requirements

(1) The general admission requirements for studying at a university in accordance with the Regulations on the Qualification for Study at Universities of the Free State of Bavaria and the State-Accredited Private Universities (Verordnung über die Qualifikation für ein Studium an den Hochschulen des Freistaates Bayern und den staatlich anerkannten nichtstaatlichen Hochschulen, QualIV, BayRS 2210-1-1-3-K/WK), as amended, need to be met for the Bachelor's Degree Program Aerospace.

(2) In addition, proof of aptitude in accordance with the rules for aptitude assessment for the Bachelor's Degree Program Aerospace dated 26 April 2021 as amended is required.

(3) [1]Furthermore, a discipline-specific, relevant work placement lasting at least eight weeks completed before commencing studies is required (pre-study internship). [2]Proof should be provided with a qualified internship certificate or a report confirmed by the internship company or institution. [3]The proof should be provided before commencing studies, or two weeks before the end of the second semester of enrollment in the degree program. [4]The type and scope are covered in Appendix 2: Guidelines for the Industrial Internship.

(4) [1]If the training language is not German, proof of basic knowledge of the German language will be required. [2]This proof can be provided with a recognized language test like the Goethe Certificate (level A2), telc (level A2), or the DSH exam (DSH-1).

§ 37
Modular Structure, Courses, Language of Instruction

(1) [1]General provisions concerning modules and courses are set out in §§ 6 and 8 of the APSO. [2]For any changes to the stipulated module provisions, § 12(8) of the APSO applies.

(2) The curriculum listing the required and elective modules is included in Appendix 1.

(3) [1]As a rule, the language of instruction in the Bachelor's Degree Program Aerospace is English. [2]If individual modules are offered either in German or English among the elective studies, this is specified in Appendix 1 for the respective module. [3]The examiner will announce the language of instruction in a suitable way by the first day of classes at the latest.

§ 37 a
"Engineering Internship" Practical Research

(1) [1]An "Engineering Internship" is a pass/fail credit requirement in accordance with § 6(7) APSO, as part of practical research elective studies. [2]Its duration is at least 6 weeks (8 credits). [3]Successful participation is confirmed by the companies and institutions where the internship was undertaken and verified with internship reports. [4]The type and scope are covered in Appendix 2: Guidelines for the Industrial Internship.

(2) [1]Alternatively, within the framework of the practical research elective studies, a project seminar can also be completed at a TUM professorship if places are available. [2]The project seminar also has a duration of six weeks (8 credits). [3]Successful participation is proven through project work. [4]The topics for the project seminar will be assigned and supervised by an expert examiner (*Themensteller* or *Themenstellerin*) in accordance with the APSO.

(3) The Examination Board decides on the recognition of successfully completed vocational training or an equivalent achievement as equivalent to a professional internship.

§ 38
Examination Deadlines, Academic Progress Checks, Failure to Meet Deadlines

(1) Examination deadlines, academic progress checks, and failure to meet deadlines are governed by § 10 of the APSO.

(2) [1]The "Basic Mathematics" and "Engineering Mechanics I - Statics" required modules need to be successfully completed by the end of the second semester of enrollment in the degree program. [2]In the event of failure to comply with these deadlines § 10(5) of the APSO applies.

§ 39

Examination Board

In accordance with § 29 of the APSO, the board responsible for all decisions concerning examination matters is the Master's Examination Board Aerospace at the TUM School of Engineering and Design.

§ 40
Recognition of Periods of Study, Coursework, and Examination Results

The recognition of periods of study, coursework, and examination results is governed by § 16 of the APSO.

§ 41
Continuous Assessment Procedure, Types of Assessment

(1) [1]In addition to written and oral examinations, types of assessment in accordance with § 12 and § 13 of the APSO may include (but are not limited to) laboratory assignments, exercises (tests, where applicable), reports, project work, presentations, learning portfolios, research papers, or parcours examinations. [2]Details of each module examination and the competencies to be assessed in each examination are set out in the module descriptions. [3]Where the topic permits, the examination can be held either as an individual or group examination; § 18(2) Sentences 2 and 3 of the APSO apply accordingly.

a) [1]A **written examination** is a supervised examination, in which students are expected to demonstrate, within a limited amount of time and using predefined methods and resources, their ability to identify problems, find solution strategies and, if required, implement them. [2]The duration of written examinations is regulated in § 12(7) of the APSO.

b) [1]Depending on the discipline, **laboratory assignments** may include experiments, measurements, field work, field exercises, etc., with the goal of students conducting such work, evaluating results, and gaining knowledge. [2]These may consist of, for example, process descriptions and the underlying theoretical principles including studying the relevant literature; preparation and practical implementation; calculations, if required, and documentation, evaluation, and interpretation of the results in the context of the knowledge to be gained. [3]Laboratory assignments may be complemented by presentations designed to demonstrate a student's communication competency in presenting scholarly work to an audience.

c) [1]**Practical credit requirements** involve students completing assigned tasks (for example, solving mathematical problems, writing computer programs, preparing models, preparing designs) using theoretical knowledge to solve application-oriented problems. [2]Exercises are designed to assess a student's factual and detailed knowledge and its application. [3]Practical exercises may be administered in writing, orally, or electronically. [4]They may be in the form of homework assignments, practice sheets, programming exercises, (e-)tests, design tasks, posters, tasks assigned within a university internship program, etc.

d) [1]A **report** is a written record and summary of a learning process for the purpose of presenting the acquired knowledge in a structured way and analyzing the results in the context of a module. [2]Students are expected to demonstrate that they have understood all essential aspects and are able to present them in writing. [3]Reports may

include excursion reports, internship reports, work reports, etc. [4]The written report may be complemented by a presentation for the purpose of assessing the student's communication competency in presenting scholarly work to an audience.

e) [1]**Project work** is designed to reach, in several phases (initiation, problem definition, role assignment, idea generation, criteria development, decision, implementation, presentation, written evaluation), the defined objective of a project assignment within a given period of time and using suitable instruments. [2]In addition, project work may include a presentation or a subject-specific discussion in order to assess a student's communication competency in presenting scholarly work to an audience. [3]It may also encompass design sketches, drawings, plans, models, objects, simulations or documentation.

f) [1]A **research paper** is a written assignment in which students work independently on solving complex scholarly or scholarly/application-oriented problems, using the scientific methods of the related discipline. [2]Students are expected to demonstrate that they are able to solve problems corresponding to the learning results of the module in question in compliance with the guidelines for scholarly work – from analysis and conception to implementation. [3]Research papers, differing in their requirement standards, may take the form of a conceptual framework/theory paper, abstract, term paper, seminar paper, etc. [4]The research paper may be complemented by a presentation and/or a colloquium for the purpose of assessing the student's communication competency in presenting scholarly work to an audience.

g) [1]A **presentation** is a systematic and structured oral performance supported by suitable audio-visual equipment (such as projector, slides, posters, videos) for the purpose of demonstrating and summarizing specific issues or results and paring complex problems down to their essential core. [2]For the presentation, the student is expected to demonstrate that he or she is capable of preparing a certain topic within a given time frame in such a way as to present or report it in a clear and comprehensible manner to an audience. [3]In addition, the student is expected to demonstrate that he or she is able to respond competently to any questions, suggestions, or discussions brought by the audience and relating to his or her subject area. [4]The presentation may be complemented by a brief written precis.

h) [1]An **oral examination** is a timed, graded discussion on relevant topics and specific questions to be answered. [2]In oral examinations students are expected to demonstrate that they have understood the central concepts of the subject matter covered by the exam and are able to apply them to specific problems. [3]The duration of the examination is regulated in § 13(2) of the APSO.

i) [1]A **learning portfolio** is a collection of completed work compiled by the student according to predefined criteria that exhibits the student's progress and achievements in defined content areas at a given time. [2]Students are required to explain why they chose the work they have and its relevance for their learning progress and the achievement of the defined learning outcomes. [3]With the learning portfolio, students are expected to demonstrate that they have taken active responsibility for their learning process. [4]Depending on the module description, types of independent study assessment in a learning portfolio may include, in particular, application-oriented assignments, web pages, weblogs, bibliographies, analyses, conceptual framework/theory papers, as well as the graphic representation of facts or problems. [5]A subject-specific final oral discussion for the purpose of reflection and based on the content of the learning portfolio may also take place.

j) [1]The **parcours examination** is made up of several components. [2]Unlike a module examination component, parcours exam components are administered in sequence

and completed in a specific time frame and location. [3]Parcours components entail various types of examination, which together evaluate the competency profile of the module as a whole. [4]Possible types of examination in parcours components may include those listed in g) and h) in combination with a practical requirement. [5]The total duration of the parcours examination with all its components is indicated in the module catalog.

(2) [1]As a rule, module examinations are taken concurrently with the program. [2]The type and duration of module examinations is stipulated in Appendix 1. [3]For any changes to the stipulated module provisions § 12(8) of the APSO applies. [4]The assessment of the module examination is governed by § 17 of the APSO. [5]The grade weights of module examination components correspond to the weighting factors assigned to them in Appendix 1.

(3) Where Appendix 1 provides that a module examination is either in written or oral form, the examiner will inform the students officially and in appropriate form, no later than the first day of classes, of the type of examination to be held.

(4) [1]At the request of the students and with the consent of the examiners, examinations may be taken in German for English-language course offerings. [2]Sentence 1 applies accordingly for examinations in English taken for German-language course offerings.

§ 41 a
Multiple Choice Tests

The conduct of multiple choice tests is governed by § 12 a of the APSO.

§ 42
Coursework (Pass/Fail Credit Requirements)

[1]In addition to the examinations named in § 45(1), proof is required of successful completion of pass/fail credit requirements in the modules in accordance with Appendix 1 amounting to a total of 11 credits as well as another pass/fail credit requirement amounting to 8 credits from the “Engineering Internship” elective studies in accordance with § 37 a as part of the bachelor’s examination. [2]Instead of the examinations to be taken in elective modules in accordance with § 45(2) Sentence 2, some elective modules may also require the completion of coursework. [2]In these cases, the number of credits to be earned in the electives according to § 45(2) Sentence 2 will be reduced accordingly.

§ 43
Registration for and Admission to Examinations

(1) Students who are enrolled in the Bachelor’s Degree Program Aerospace are deemed admitted to the module examinations of the bachelor’s examination.

(2) [1]Registration requirements for required and elective module examinations are stipulated in § 15(1) of the APSO. [2]Registration requirements for repeat examinations are stipulated in § 15(2) of the APSO.

(3) [1]As an exception to § 42(2), students are deemed to be registered for the examinations in the “Basic Mathematics” and “Engineering Mechanics I – Statics” required modules of the Bachelor's Degree Program Aerospace listed in Appendix 1 for the respective semester in which the student is enrolled. In case of failure to attend the examination

date, the module examination is considered taken and not passed, unless there are valid reasons as specified in § 10(7) of the APSO.

§ 44
Repeat Examinations, Failed Examinations

(1) The repetition of examinations is governed by § 24 of the APSO.

(2) Failure of examinations is governed by § 23 of the APSO.

II. Bachelor's Examination

§ 45
Scope of the Bachelor's Examination

(1) The bachelor's examination consists of:

1. the module examinations in the corresponding modules according to § 43(2),
2. the Bachelor's Thesis module in accordance with § 46 and
3. and the coursework listed in § 42.

(2) [1]The module examinations are listed in Appendix 1. [2]Students must complete 109 credits in the required modules and at least 40 credits in elective modules. [2]The selection of modules must comply with § 8(2) of the APSO.

§ 46
Bachelor's Thesis

(1) As part of the bachelor's examination, each student must write a bachelor's thesis in accordance with § 18 of the APSO.

(2) [1]Students who have earned a minimum of 120 credits, of which at least 99 credits have to come from required modules as listed in Appendix 1, are permitted to commence work on the bachelor's thesis. [2]Students must commence work on the thesis no later than 6 weeks after their "Admission to Commence Bachelor's Thesis". [3]If the requirements stated in § 46(2) Sentence 1 have been fulfilled, students will be granted approval to commence the Bachelor's Thesis module by the Examination Board upon request. [4]Upon presentation of the Notice of Approval, the thesis topic will be issued, and the thesis will be supervised by an expert examiner (Themensteller).

(3) [1]The period between topic assignment and submission of the completed thesis must not exceed six months. [2]The bachelor's thesis is considered presented and not passed if the student fails to submit it on time without valid reasons as specified in § 10(7) of the APSO. [3]12 credits are awarded for the Bachelor's Thesis module; this is equivalent to a full-time workload of nine weeks for the bachelor's thesis. [4]The thesis may be written in either the German or the English language.

(4) [1]The completion of the bachelor's thesis module involves a research paper and a presentation on its content. [2]The presentation does not affect the grading.

(5) [1]If the Bachelor's Thesis module was not graded as at least "sufficient" (4.0), it may be repeated once with a new topic. [2]Students must renew their application to prepare the Master's Thesis module within six weeks of receipt of the grade.

§ 47
Passing and Assessment of the Bachelor's Examination

(1) The bachelor's examination is deemed passed when all examinations required for the bachelor's examination in accordance with § 45(1) have been passed and a plus credits account of at least 180 credits has been achieved.

(2) [1]The module grade will be determined according to § 17 of the APSO. [2]The final grade for the bachelor's examination is calculated as a weighted average grade in accordance with § 45(2) and the Bachelor's Thesis module, whereby a weighting factor of 2 needs to be taken into account with the grade for the Bachelor´s Thesis module in addition to the weighting with 12 credits. [3]The grade weights of the other modules correspond to the credits assigned to each module. [4]The overall assessment is expressed by the designation according to § 17 of the APSO.

§ 48
Degree Certificate, Diploma, Diploma Supplement

If the bachelor's examination was passed, a degree certificate, a diploma, and a diploma supplement including a transcript of records are to be issued in compliance with § 25(1) and § 26 of the APSO.

III. Final Provisions

§ 49
Entry into force

(1) [1]These regulations will enter into force on 1 April 2024. [2]They apply to all students who commence their studies at the Technical University of Munich as of the winter semester 2024/2025.

[1]At the same time, the Academic and Examination Regulations for the Bachelor's Degree Program Aerospace at the Technical University of Munich dated 26 April 2021 cease to apply, unless the provision in § 49(1) Sentence 2 of these regulations apply. [2]Students who commenced their studies at the Technical University of Munich prior to the winter semester 2024/2025 are to complete their studies in accordance with the regulations named in § 49(2) Sentence 1.

APPENDIX 1: Examination Modules

REQUIRED MODULES

Module No.	Module Name	Type of Instruction SWS	Sem.	SWS	Credits	Type of Examination	Duration of Examination	Weighting factor	Language of Instruction
MA9801	Basic Mathematics	5V, 2Ü	1	7	8	Written exam	90		English
LRG0010	Engineering Mechanics I - Statics	3V, 4Ü	1	7	6	Written exam	90		English
LRG0060	Computational Foundations I	2V, 1Ü	1	3	5	Written exam	90		English
LRG0020	CAD/TD for Aerospace Engineers	2V, 1Ü	1	3	3	Project work			English
LRG0040	Aerospace Materials Science and Processing	4V, 4Ü	1+2	8	7	Written exam	90		English
LRG0080	Electrical Engineering	4V, 2Ü	1+2	6	7	Written exam	90		English
MA9802	Differential and Integral Calculus	5V, 2Ü	2	7	8	Written exam	90		English
LRG0011	Engineering Mechanics II - Structural Mechanics Modeling	2V, 4Ü	2	6	5	Written exam	90		English
LRG0061	Computational Foundations II	2V, 1Ü	2	3	5	Written exam	60		English
LRG0030	Thermodynamics I	2V, 4Ü	2	6	5	Written exam	90		English
MA9803	Modeling and Simulation with Ordinary Differential Equations	2V, 2Ü	3	4	5	Written exam	60		English
LRG0012	Engineering Mechanics III – Dynamics	2V, 4Ü	3	6	5	Written exam	90		English
LRG0031	Thermodynamics II	2V, 1Ü	3	3	5	Written exam	90		English
LRG0070	Fluid Mechanics I	3V, 1Ü	3	4	6	Written exam	90		English
ED110124	Aerospace Structures and Elements - Fundamentals	2V, 3Ü	3	5	5	Written exam	60		English
ED110125	Aerospace Structures and Elements - Project	2V, 1Ü, 2P	4	5	4	Project work	-		English
MW1410	Heat Transfer	2V, 1Ü	4	3	5	Written exam	90		English
LRG0071	Fluid Mechanics II	2V, 1Ü	4	3	5	Written exam	90		English
LRG0081	Automatic Control Engineering	3V, 2Ü	4	5	5	Written exam	90		English
LRG0090	Test, Analysis, and Simulation	2V, 1Ü	4	3	5	Written exam	90		English
	Total				**109**				

BACHELOR'S THESIS

LRG0005	Bachelor's Thesis		6	-	12	Research paper (incl. presentation)			German or English

Elective Modules:
The Examination Board regularly updates the elective modules course catalog. Any changes will be communicated via TUMonline no later than at the beginning of the semester.

a) Engineering Electives
A total of at least 20 credits must be earned in elective engineering modules. (At least) one module needs to be successfully completed from each of the "System Electives" and "Modeling Electives" lists. Furthermore, where possible, students should choose modules so that two of the three specialist areas "System", "Dynamics" and "Propulsion" are covered. The modules are examples and are subject to updates by the Examination Board.

Module No.	Module Name	Type of Instruction SWS	Sem.	SWS	Credits	Type of Examination	Duration of Examination	Weighting factor	Language of Instruction
"System Electives" (at least 1 module)									
LRG0100	Aircraft Design Basics	2V, 1Ü	4	3	5	Written exam	90		English
LRG0101	Rotorcraft and VTOL Design Basics	2V, 1Ü	4	3	5	Written exam	90		English
LRG0102	Aeronautic Propulsion Systems	2V, 1Ü	4	3	5	Written exam	90		English
ED110104	Introduction to Spaceflight	2V, 2Ü	4	4	5	Report			English
	…								
"Modeling Electives" (at least 1 module)									
LRG0110	Computational Aerodynamics	2V, 1Ü	5	3	5	Written exam	90		English
LRG0112	Dynamic simulation for vehicles, machines, and mechanisms	2V, 1Ü	5	3	5	Written exam Project work (2:1)*	60	2:1	English
LRG0113	Systems, Theory and Modeling	2V, 1Ü	5	3	5	Written exam	90		English
	…								
"Optional Engineering Electives"									

MW2462	Grundlagen der Additiven Fertigung	2V, 1Ü	5	3	5	Written exam	90		English or German
MW0007	Aerodynamik des Flugzeugs 1	2V, 1Ü	5	3	5	Written exam	90		German
MW0832	Aircraft Performance	2V, 1Ü	5	3	5	Written exam	90		English
MW0837	Fundamentals of Flight Control	2V, 1Ü	5	3	5	Written exam	90		English
ED110106	Systems Engineering - Fundamentals	2V, 2Ü	4	4	5	Report	-		English

* Both examinations needs to be successfully taken to pass the module.

b) Engineering Supplementary Courses: At least 6 credits are required from the supplementary courses. Alternatively these 6 credits can also be acquired from the engineering elective modules listed in the electives module catalog if they have not already been selected there.

Module No.	Module Name	Type of Instruction SWS	Sem.	SWS	Credits	Type of Examination	Duration of Examination	Language of Instruction
MW2314	Aircraft Systems	2V	6	2	3	Written exam	60	English
LRG6002	Sustainability in Aviation	2V	5	2	3	Written exam	60	English
ED110086	Space Resources	2V	5	2	3	Written exam	60	English

c) Free Elective Modules: As part of the free elective modules amounting to 5 credits, you can freely select modules from other schools or higher education institutions, among others from the cross-discipline course offerings at TUM.

COURSEWORK (PASS/FAIL CREDIT REQUIREMENTS)

The following modules are to be completed as coursework. The content of the “Engineering Project” module will be announced at the beginning of the semester on the web pages for the degree program.

LRG0200	Introduction to Aerospace	2V	1	2	3	Report (SL)	-		English
LRG0201	Introduction to Geodesy and Geoinformation	2V	3	2	3	Written exam (SL)	90		English

LRG0202	Engineering Project	2P	5	2	5	Report (SL)	-		English or German
	Total				**11**				

PRACTICAL RESEARCH

a) Aerospace Lab Courses

A minimum of 9 credits must be earned from this area. One module from the “Aerospace Lab Course I” catalog and one module from the “Aerospace Lab Course II” module are required for this. The modules of the “Aerospace Lab Course II” catalog are also offered in collaboration with other TUM schools and departments and are continuously updated by the Examination Board.

Module No.	Module Name	Type of Instruction SWS	Sem.	SWS	Credits	Type of Examination	Duration of Examination	Language of Instruction
Aerospace Lab Course I								
LRG0120	Design / Build / Fly	4P	5	4	5	Project work		English or German
LRG0121	Helicopter Lab Course	4P	5	4	5	Laboratory assignment		English or German
LRG0122	Testing of UAV Systems	4P	5	4	5	Report		English or German
MW0747	Luftverkehrsszenarien	4P	6	4	4	presentation	90	English or German
	…							
Aerospace Lab Course II								
MW2381	Aerospace electronics practical course	4P	6	4	4	Laboratory assignment		German
MW1068	Practical Training in Materials and Process Technologies for Carbon Composites	4P	6	4	4	Written exam	60	English
MW1007	Grundlagen der Luftfahrtpraxis	3P	5	3	4	Written exam	180	German
MW2313	MATLAB/Simulink for Computer Aided Engineering practical course	4P	5/6	4	4	Written exam	90	English
	…							

b) Engineering Internship (pass/fail credit requirement)

A professional internship is a pass/fail credit requirement amounting to 8 credits for successful completion of the Engineering Internship. It involves a six-week Engineering Internship. Alternatively practical project work can be carried out at a TUM Chair (project seminar) as long as places are available.

LRG0006	Engineering Internship	P	5		8	Report (SL)		English or German
LRG0007	Project Seminar	7S	5	7	8	Project work (SL)		English or German

Explanation:
Sem. = semester; SWS = Semesterwochenstunden/weekly hours per semester; V = Vorlesung/lecture; Ü = Übung/exercise; P = Praktikum/practical course; S = seminar; SL = Studienleistung/coursework summer semester
The column Examination Duration indicates the examination duration in minutes.

Appendix 2: Guidelines for the Industrial Internship

Guidelines for the Practical Education and Training of Students in the Bachelor's Degree Program Aerospace at the Technical University of Munich

Department of Aerospace and Geodesy
TUM School of Engineering and Design
Technical University of Munich

Applicable to all students who commence their studies in the field of Aerospace at the TUM School of Engineering and Design from the winter semester 2024/2025.

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1. Training Objective of the Practical Work

[1]Aerospace engineers work in different fields of research, development and in the area of “Service and Operations”; they work in planning and management, supervise complex systems, coordinate their operation, including maintenance, and also perform related commercial and sales tasks. [2]In all of these areas, it is typical for a synthesis to form between different disciplines and aspects. [3]This should also be reflected in the industrial internship by acquiring knowledge that complements the academic engineering studies and gaining experience from the world of work – not least also from workshops. [4]This is not just about learning specific techniques and procedures, but also about gaining practical insight into activities and fields of work.

[5]Another key aspect involves addressing the sociological side of the field. [6]The interns also need to understand companies as a social structure and learn about relations between management and staff members in order to correctly classify their own future position and possible role – often as supervisors.

[7]Overall the internship provides important experience for later positions of responsibility and is part of professional education and training.

2. Industrial Internship

The full industrial internship comprises a pre-study internship and a specialized internship.

2.1 Pre-study internship

[1]The purpose of the pre-study internship is to convey fundamental knowledge of manufacturing technology that can also be acquired during internships in smaller companies. [2]Knowledge of manufacturing technology is one requirement for understanding what is feasible and can be implemented in practice. [3]Furthermore, knowledge from the pre-study internship contributes to understanding the lectures and exercises in the design subjects for the bachelor’s degree.

[4]As a rule, the pre-study internship is completed in industrial manufacturing, where students gain indispensable elementary knowledge. [5]The interns should learn about the practical applications and gain an overview of the manufacturing facilities and processes with the help of expert supervisors. [6]The interns should also gain insight into quality assurance and inspections. [7]The pre-study internship can, however, also be taken in one of the other two relevant fields of the aerospace industry, like in development, or the service or operations area.

2.2 Specialized internship

[1]The specialized internship should provide interns with a general insight into later working life, technical/business, or organizational contexts, or also the significance of technology and engineering in our society. [2]This part of the internship allows great freedom of choice with significant individual responsibility depending on the inclination of the students and the possibilities on offer. [3]Within the framework of the Bachelor’s Degree Program Aerospace, the specialized internship can be completed in at least six weeks in the 5th semester of enrollment in the degree program (Fachsemester) and is worth 8 credits. [4]Alternatively, it is possible to complete a “project seminar” at the Chair that also lasts six weeks and is worth 8 credits. [5]In this case, the project seminar counts as a separate field.

3. Duration and Work Areas of the Industrial Internship

3.1 Duration

[1]The industrial internship involves an obligatory pre-study internship lasting at least eight weeks that is followed by a specialized internship of at least six weeks. [2]If an internship is partially taken into account, the training period in a company must be at least one consecutive week. [3]To cover one of the fields named in No. 3.2, four consecutive weeks need to be proven. [4]The weekly working hours are based on the collectively agreed working hours that apply in Germany.

3.2 Work Areas

[1]The requirements for the whole industrial internship are met when internships have been completed in two of the three possible work areas:

A). Manufacturing,
B). Development and
C). Service/Operations

[2]An area counts as covered when an internship of at least four weeks in succession has been completed.

3.3 Timeframe

The pre-study internship that lasts at least eight weeks should be completed before the start of the degree program; the respective documents and certificate need to be submitted to the internship office for Aerospace and Geodesy at the TUM School of Engineering and Design at the latest two weeks before the end of the second semester of enrollment.

4. Completion of Industrial Internships

4.1 Internship plan

[1]The pre-study internship and the specialized internship do not differ in terms of content requirements. [2]They can be completed in either manufacturing, development, or the service/operations area.

[3]Typical activities that form part of the *pre-study internship* are working on:

- Manufacturing techniques, like forming or machining manufacturing processes, joining and cutting processes, fitting, integration, and assembly
- Activities in the area of inspection and quality assurance
- Work in investigations, development, design, calculation, and testing of technical concepts, machines, components, materials, processes, and methods
- Manufacturing development and production planning
- Servicing and maintenance activities

[4]On the *specialized internship*, activities that complement or build on the university studies to a great extent are recommended, e.g.:

- Project management tasks, i.e. planning, coordination, and technical/commercial supervision of project procedures
- Technical monitoring and work on operation of complex facilities and systems.
- Sales work and marketing of technical products
- Writing complex technical offers
- Tasks in technically oriented company planning
- Investigations into needs, requirements, and impact of existing/planned technical systems or products in terms of environment and society.

[5]The named tasks are performed at medium-sized and large companies, and in some cases at authorities and organizations. [6]In addition to a certain variety in tasks, students should also aim to work in different posts so they get to know different department or company cultures. [7]However, most of the listed activities call for a certain amount of time for initial training. This means an internship of several consecutive weeks is required to make the work worthwhile.
[8]It normally only makes sense to go on the specialized internship after the fourth semester of enrollment in the degree program (Fachsemester).
[9]Regardless of the respective fields of activity, an overview should be gained of the company's services and products as well as of the technical/organizational assignment of the departments where the intern works. [10]This should be described in the internship report.
[11]The specialized internship can be replaced partly or completely by a pre-study internship as long as it complies with these guidelines in terms of duration and distribution.

4.2 Report and Proof of Internship Achievements

[1]Successful completion of the internship or its parts is proven by:

1. a respective report signed by the student that states which area A, B, or C the internship should be assigned to. The report on the pre-study internship should cover about three to four pages (continuous text, work steps, sketches, special points,...). For the specialized internship, a description of the tasks performed should be included (about 5 pages as a guide value) in addition to the product and organization descriptions named in 4.1 for the internship company; the former can be omitted if instead the student can submit a technical report on their work during the internship period written for the internship supervisor,
2. a suitable internship certificate issued by the company that indicates the work period, the tasks performed, and the social behavior of the intern at the company,
3. and the corresponding internship certificate for the Bachelor's Degree Program Aerospace.

[2]The internship achievements are proven by submitting the above-listed documents to the internship office (see 7. Recognition of Internship).

5. Interns at Companies

5.1 Training Companies

[1]The knowledge of manufacturing processes, observation of economic working methods, and an understanding of the social side of the work process to be gained during the internship should preferably be acquired at industrial companies that are also recognized as training companies by the German Chamber of Industry and Commerce. [2]The internship can be completed at companies in the aerospace industry, mechanical engineering, the automotive, electrical and chemical industries, the mining industry, Deutsche Bahn and in larger craft businesses, provided that all requirements for training in accordance with these guidelines are met. [3]Work at schools, universities, and research institutions can be recognized if it corresponds with the guidelines.

5.2 Supervision of Interns

[1]Interns are generally supervised by contact persons at the companies, who provide appropriate support in line with the company's training opportunities. [2]They also inform the interns about technical issues in talks and discussions.

[3]University student interns are not obliged to attend vocational schooling. [4]Voluntary participation in lessons at the company training center should not detract from the already brief internship work.

6. Legal and Social Standing of Interns

6.1 Application for an Internship

[1]Before commencing the internship, future interns should thoroughly familiarize themselves with the guidelines either by reading this document or, in special cases, by inquiring at the internship office of the Department of Aerospace and Geodesy at the TUM School of Engineering and Design, in particular the sections covering the performance of the internship and reports on the internship work. [2]Since internship posts cannot be arranged by the university, the interns themselves have to contact the companies to inquire about internships. [3]The internship office and the student body for Aerospace and Geodesy can provide help with this.

6.2 Internship Contract

[1]The internship is legally regulated by the employment contract signed between the company and the intern. [2]The contract sets out all rights and obligations of the intern as well as the type and duration of the internship.

6.3 Funding for Practical Training

[1]The specialized internship and also the pre-study internship count as training in tertiary education and are therefore eligible for funding in accordance with the German Federal Training Assistance Act (BAföG). [2]Interns should contact the authority responsible for their place of residence to obtain grants.

6.4 Insurance Requirements

Issues related to insurance requirements are covered by the respective laws.

6.5 Vacation, Sickness, and Absence

[1]Absences of more than three days during the internship have to be made up for. [2]This includes working hours missed due to sickness, vacation, or other reasons. [3]Company vacation close-downs also count as absent days. [4]The only exception is statutory public holidays. [5]In the event of absence, interns should ask the company to extend their contract so they can complete the training phase they have started with the required number of days.

[6]If the interns provide a medical certificate stating that they are unable to fully carry out the required activities during the production internship due to a long-term or permanent physical disability, or chronic illness, the missing time can be compensated for by working in design offices, work preparation, material testing, and laboratories after consultation with the internship office.

7. Recognition of Internship

[1]Fulfillment of the requirements for the industrial internship is checked by the internship office for Aerospace and Geodesy at the TUM School of Engineering and Design. [2]The documents listed under 4.2 need to be submitted (digitally) for this purpose.
[3]The type and duration of the individual work phases need to be clearly indicated in these documents.
[4]The internship office decides to what extent the practical work complies with this guideline and can therefore be accepted as an internship. [5]If insufficient reports are submitted for an internship, it will not be recognized or only part of its duration will be accepted. [6]The internship office may demand

additional training weeks if internship certificates and reports do not prove sufficient performance of individual internship requirements.

8. Special Provisions

8.1 Professional Training

[1]Relevant practical work experience that meets the requirements of these internship guidelines will be credited towards the maximum 14-week duration of the internship. [2]An apprenticeship is recognized to the extent that it complies with the internship guidelines.

8.2 Non-Industrial Internships

General Provisions

[1]Internships in the non-industrial sector require prior approval from the internship office. [2]Furthermore, the sum of all activities in the non-industry area may not exceed four weeks.

Internship for Conscripts in the German Armed Forces (Bundeswehr)

[3]It is the responsibility of the degree program applicants to apply for placement in a suitable technical unit before beginning their military service. [4]Training periods completed there can be recognized following consultation with the internship office with a maximum of six weeks if activities are performed in accordance with 3.2. of these guidelines. [5]For the purpose of recognition, the corresponding reports and certificates (ATN number and military service certificates) are to be submitted to the internship office. [6]The Federal Minister of Defense issued a decree (see Ministerial Gazette of the Federal Minister of Defense 1963, p. 291, as amended on 12/07/1967, VMBl 1967, p. 213) authorizing the keeping of internship reports and the issuing of internship certificates.

[7]In addition to those performing basic military service, this crediting rule also applies correspondingly to soldiers serving for longer periods (temporary soldiers) and to those performing civilian or alternative service.

8.3 Other Industrial Employment Relationships

[1]If the internship guidelines are met, work as a student trainee or other gainful employment can be recognized as an internship.

[2]Student work performed in a company cannot be recognized as an industrial internship, and vice versa. [3]While an internship should provide insight into a wide range of techniques and processes, student work requires further-reaching and increasingly independent work on specific technical-engineering tasks by the student.

[4]If there are uncertainties about the compatibility of an intended internship with these guidelines, students should seek advice from the internship office in advance.

8.4 Internships Abroad

[1]Completing parts of the internship abroad will be an advantage in later careers. [2]It will not only boost the specialist qualification of prospective engineers, but also provide them insight into cultural, social and economic structures in other countries. [3]Therefore, students can complete their industrial internship in suitable companies abroad, as long as the knowledge gained there corresponds with the

set training plan. [4]The reports should be written either in German, English, or be bilingual (German plus local language). [5]The internship certificate needs to be submitted in the respective official language along with a certified translation into German. [6]One exception is English-language certificates. [7]A translation is not required in this case. [8]A duration of up to 14 weeks is recognized.

9. Inquiries

Questions and individual applications related to these guidelines should be addressed to the internship office for Aerospace and Geodesy at the TUM School of Engineering and Design

Postal address: Technical University of Munich

Aerospace and Geodesy internship list

Boltzmannstraße 15, 85748 Garching bei München

Email: internship.asg@ed.tum.de

Executed following a resolution of the Senate of the Technical University of Munich dated 11 October 2023 and approval of the President of the Technical University of Munich on 6 November 2023.

Munich, 6 November 2023

Technical University of Munich

signed by
Thomas F. Hofmann
President

These Regulations were made available for inspection at the Technical University of Munich on 9 November 2023, following their announcement on 9 November 2023. Day of proclamation is therefore 9 November 2023.