

**Regulations for the degree programme  
Aerospace Engineering  
(M.Sc.)**

Implementation regulations  
with appendices  
I: Study and examination plan  
II. Competence descriptions  
III: Module handbook (*only published electronically*)  
dated 27 October 2020

Resolution of the Departmental Council on 27/10/2020

Entry into force of the Regulations for the Degree Programme on 01 October



TECHNISCHE  
UNIVERSITÄT  
DARMSTADT

The Regulations for the Degree Programme M.Sc. Aerospace Engineering of the Department of Mechanical Engineering, dated 27 October 2020, supplementing the APB (Allgemeine Prüfungsbestimmungen – General Examination Regulations) of Technical University of Darmstadt, have been published, based on the approval of the Executive Board of Technical University of Darmstadt on 28 January 2021 (Ref. 652-4-1).

Darmstadt, 28 January 2021

The President of Technical University of Darmstadt  
Prof. Dr. Tanja Brühl

Die englische Übersetzung dient nur zu Informationszwecken. Rechtlich verbindlich ist der deutsche Text.  
The English translation is for information purposes only. The legally binding document is the German version.

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## 1. Implementation regulations

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### For Section 2(1): Degrees

The degree programme M.Sc. Aerospace Engineering is maintained by the Department of Mechanical Engineering at Technical University of Darmstadt. Technical University of Darmstadt awards the degree Master of Science once the total of 120 credit points (CPs) required for the degree programme has been achieved.

### For Section 5(2),(3): Modules, components and type of examination

Appendix I, the study and examination plan, to these implementation regulations specifies the type (technical examination, study examination), scope, number and form (oral, written or special form and specification) of the examination components as well as the weighting with which these are included in the overall grade for the module.

Examinations that are taken in other departments are governed by the regulations of the departments offering them.

### For Section 11(3): Multimedia-supported examination components

Oral examinations can be carried out via video conferencing, provided that it is unobjectionable under data protection law and based on mutual consent of both examinee and responsible examiner. The usual withdrawal periods apply.

### For Section 11(4),(5): General admission requirements – language of instruction

The language of instruction for the degree programme is English.

Individual modules can be offered in German. This is indicated in the module description. It should be assumed that the module will also involve reading and working with academic literature in German.

### For Section 17a(1): Entry requirements and entrance competencies for Master's degree programmes

The entry requirements for the Master's degree programme Aerospace Engineering and, in particular, the previous knowledge and qualifications (entrance competencies) required from the applicants are defined below.

For applicants who have obtained a degree in a member state of the European Union that entitles them to be admitted to the Master's degree programme, the application deadline for the Master's degree programme Aerospace Engineering is 15 July of the year (cut-off period) for a winter semester and 15 January of the year for the summer semester (cut-off period).

For all applicants, the application deadline is 15 January of the year (cut-off period) for a winter semester and 15 July of the previous year (cut-off period) for a summer semester.

The following documents have to be submitted by the cut-off period:

1. Fully completed application request
2. Current transcript of records
3. Equivalence table

### For Section 17a(2): Entrance competencies for a consecutive Master's degree programme

The entrance competencies for the consecutive Master's degree programme Aerospace Engineering are based on the competence profile defined for the Bachelor's degree programme *Maschinenbau* –

*Sustainable Engineering* at Technical University of Darmstadt that is used as a reference degree programme for admission to the Master's degree programme.

Details regarding the entrance competencies are specified in the competence description in Appendix II. The entry requirement for the Master's degree programme *Aerospace Engineering* is a Bachelor's degree in the reference degree programme at Technical University of Darmstadt or a degree in a degree programme that teaches competencies that are not substantially different from those taught in the reference degree programme (comparable degree programme).

#### **For Section 17a(4) lit. a) and b): Formal entrance examination**

During the formal entrance examination, proof of the required entrance competencies is verified on the basis of the written documents to be submitted by the applicants. The following documents must be submitted: the transcript for the first degree and the Diploma Supplement or comparable documents for the degree programme leading to the first degree.

In addition,

- (1) Applicants must submit the following additional documents:  
Equivalence table
- (2) Applicants can submit the following additional documents:  
Admission and aptitude tests of other universities or private providers

#### **For Section 17a(4) lit. c): Substantive entrance examination**

If the entrance competencies could not be clarified positively or negatively during the formal entrance examination, a substantive entrance examination is then conducted. The entrance examination cannot be retaken in this application procedure.

The following is carried out as part of the substantive entrance examination:

- (1) A supervised written examination of 120 minutes on the premises of Technical University of Darmstadt;
- (2) A supervised written examination of 120 minutes at locations outside of Technical University of Darmstadt. The locations, where the written examination will take place, will be announced during the application phase.

The Examination Board can decide to offer the written examination as an online test as well.

#### **For Section 17a(8): Admission subject to conditions**

If, after an entrance examination, it is found that the applicant lacks entrance competencies that can be compensated for by completing modules amounting to no more than 30 CPs, admission may be granted subject to conditions. The letter of admission lists the modules or technical examinations that are required. The conditions must be met by the end of the second regular semester.

The conditions are governed by the APB (Allgemeinen Prüfungsbestimmungen – general examination regulations) of Technical University of Darmstadt with the exception of the second resit/retake examination in accordance with Section 31 APB and the oral supplementary examination (mEP) in accordance with Section 32 APB, i.e. only two attempts per condition are permitted.

**For Section 18: Admission requirements**

The admission requirements for examinations or modules, if any, are specified in Appendix I, the study and examination plan, to these implementation regulations, and in Appendix III, the module descriptions.

**For Section 22(2): Conducting examinations – duration of the oral examination**

The duration of the oral examination (at least 15 minutes per examinee and examination) is specified in Appendix I, the study and examination plan, to these implementation regulations.

**For Section 22(5): Conducting examinations – duration of supervised examinations**

The duration of supervised examinations (at least 45 minutes) is specified in Appendix I, the study and examination plan, to these implementation regulations.

**For Section 23(2): Thesis – requirements**

For the topic of the thesis to be issued, the student must have

(1) earned at least 65 CPs

(2) and passed the modules below

- Two Advanced Design Projects OR one Advanced Design Project plus one external project work
- Tutorial
- One module from the Compulsory Elective area Ia – Fundamentals
- One module from the Compulsory Elective area Ib – Digitalisation

in this degree programme.

**For Section 23(3): Thesis– examiner**

The examiner may only have examined one of the two Advanced Design Projects.

**For Section 23(5): Thesis– preparation time**

The thesis includes a workload of 30 CPs (900 hours) and must be completed and submitted within 24 weeks.

The Master's thesis is finalised during a public colloquium (defence) with at least one examiner being present.

**For Section 25(1),(3): Formation and weighting of grades**

The assessment system for each examination component is specified in Appendix I, the study and examination plan, to these implementation regulations. The study and examination plan also specifies how the grades for the technical examinations and study examinations are weighted for module grading. Unless otherwise specified, the grades of each examined component within a specific module are totalled and weighted according to the credit points assigned to each of these components to produce the final module grade.

### **For Section 28(3): Overall grade**

Appendix I, the study and examination plan, to these implementation regulations specifies how the module grades are weighted for overall grading. Unless otherwise specified in Appendix I, the module grades are included and weighted in the overall grade according to the credit points earned in the modules.

### **For Section 31(1): Second resitting/retaking**

The second resit/retake examination can take place orally with the agreement of the examiners and examinees.

### **For Section 38a: Entry into force**

These implementation regulations take effect on 01 October 2021. They will be published in the Satzungsbeilage (appendix to the statutes) of Technical University of Darmstadt.

Appendix I Study and examination plan

Appendix II Competence descriptions

Appendix III Module descriptions

Darmstadt, 22 December 2020

The Chairperson of the Department of Mechanical Engineering

Technical University of Darmstadt

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## 1.1. Appendix I: Study and examination plan

*(see additional document)*

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## 1.2. Appendix II: Competence descriptions

### 1.2.1. Entrance competencies

The research-oriented Master's degree programme Aerospace Engineering is based on the knowledge, abilities and skills obtained in the research-oriented Bachelor's degree programme Maschinenbau – Sustainable Engineering at Technical University of Darmstadt. The Master's degree programme is open for mechanical engineers whose knowledge, abilities and skills are not substantially different from those who graduated from the Bachelor's degree programme Maschinenbau – Sustainable Engineering at Technical University of Darmstadt. As a minimum requirement, the applicants must have the necessary knowledge, abilities and skills in the fields listed below:

1. Engineering mechanics
2. Thermodynamics and heat and mass transfer
3. Machine elements and mechatronics
4. Systems theory and control engineering
5. Measurement technologies, sensors and statistical analysis
6. Numerical calculation / simulation methods
7. Fundamental fluid mechanics.

These competencies must not be substantially different regarding quality, level, content and scope from those acquired by graduates of the Bachelor's degree programme Maschinenbau – Sustainable Engineering at Technical University of Darmstadt.

### 1.2.2. Qualification objectives

Graduates of the Master's degree programme Aerospace Engineering are capable of

1. Extending the boundaries of the field and putting new and existing knowledge into perspective;
2. Working creatively by creating and designing products, processes or methods for the aerospace industry not in existence before;
3. Formulating problems from aerospace practice as questions to be solved based on the methods of research and science;
4. Examining statements about their field critically and presenting their own point of view in front of specialist colleagues and the lay public confidently;
5. Presenting results of scientific work precisely and clearly in spoken and written form;
6. Structuring complex problems by carefully and appropriately considering relevant and rapidly changing technological, economic and ecological criteria while keeping in mind their substantial relevance to safety;
7. Collaborating with members of other disciplines as befits a transnational discipline like aerospace, taking up problems of other disciplines and including scientific approaches to solve them when working on complex tasks;
8. Illustrating the challenges and consequences of engineering for society and taking responsibility for technical innovation in cutting-edge technologies and an ever-changing field of technology;
9. Entrepreneurial thinking and evaluating the economic impacts of their newly created products, processes or methods;
10. Engaging with the relevant aspects of a global market which in the aerospace sector are even more interculturally influenced than in other sectors;
11. Setting realistic, but challenging goals, putting them into practice within a reasonable period of time and reflecting on the results and the manner to get there;
12. Applying the classical competencies of mechanical engineering (domain-specific knowledge) and methods of digitalisation, such as machine learning in the fields of fundamentals, products and production, in a useful combination when programming;
13. Facing new and challenging technologies, such as additive manufacturing or fibre composite technology, and developing new, innovative and sophisticated products in this context;

14. Idealising complex structures and systems of aerospace in a suitable way, carrying out appropriate modelling and using suitable methods of analysis to design, simulate, optimise and verify as well as document their respective results.

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### 1.3. Appendix III: Module descriptions

The module descriptions are published electronically as a module handbook in accordance with Section 1(1) of the *statute of Technical University of Darmstadt regulating the publication of the statutes of Technical University of Darmstadt*, dated 18 March 2010.

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