

**Special provisions of the examination regulations
for the master's degree programme in
Additive Manufacturing
at Paderborn University**

The following regulations issued by Paderborn University are based on Section § 2 (4) and Section § 64 (1) of the North Rhine-Westphalia Higher Education Act (*Gesetz über die Hochschulen des Landes Nordrhein-Westfalen (Hochschulgesetz – HG)*) of 16 September 2014 (GV. NRW. p. 547), last amended by Article 2 of the Act of 19 December 2024 (GV. NRW. p. 1222).

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§ 33

General Provisions and Special Provisions

These Special Provisions apply in conjunction with the General Provisions of the Examination Regulations for the master's degree programmes in Sustainable Mechanical Engineering, Industrial Engineering, Chemical Engineering and Additive Manufacturing at Paderborn University, in their respective current versions (General Provisions). For an appropriate structure of the degree programme, you will find study plans in the appendix. Details on the modules can be found in the module descriptions in the appendix.

§ 34

Profile of the degree programme and competencies; language regulations

- (1) The four semester master's degree programme in Additive Manufacturing at Paderborn University combines a theory-based approach with a practice oriented one, with a focus on research and academic content, as is typical for master's degree programmes. At the same time, the programme structure ensures maximum compatibility with the bachelor's degree programme in Sustainable Mechanical Engineering. The combination of compulsory and elective modules allows students to develop either a broad or a specialised individual training profile in the field of additive manufacturing. Regardless of the chosen specialisation, the master's degree programme provides advanced technical knowledge in additive manufacturing, including essential components, material-specific methods, and design techniques in compulsory modules, as well as research-oriented specialised knowledge in freely selectable elective modules.
- (2) Graduates of the programme acquire the following competencies in particular:
 - Technical competencies:
Graduates of the master's degree programme in Additive Manufacturing have the competency to solve particularly complex tasks in the field of engineering sciences. Their professional scope ranges from research and development to strategic product planning and product marketing. Through significant expansion and deepening of their subject knowledge in their chosen specialisation, they are particularly capable of independently analysing engineering sciences problems and developing scientific methods to describe them, enabling them to conduct independent academic research.
 - Fundamental and systemic competencies:
Graduates can apply their knowledge and skills to problem-solving in new and unfamiliar situations within a broad and interdisciplinary engineering sciences context. The master's degree programme equips students with advanced subject-specific knowledge, skills, methodologies, and key qualifications, taking into account professional requirements and changes in the industry. This enables them to conduct independent academic work, communicate effectively, critically evaluate scientific findings, and act responsibly.
 - Communicative competencies:
Graduates are able to clearly and precisely present and justify results using the communicative competencies acquired during the master's degree programme. They can exchange information, ideas, problems, and solutions on a scientific level with experts in the field of engineering sciences as well as with non-experts. Additionally, they can take on significant responsibilities within a work team.
- (3) The master's degree programme and the master's examination are conducted in English.

§ 35 Admission Requirements

- (1) In accordance with § 5 of the General Provisions, admission to the programme requires a degree that includes at least the following subject areas and credit points:

Mathematical, scientific, and technical subjects 120 LP including

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| • Advanced mathematics | 20 LP |
| • Natural sciences | 5 LP |
| • Engineering Mechanics and Fluid Mechanics | 18 LP |
| • Materials engineering | 5 LP |
| • Design Engineering and Machine Elements | 18 LP |
| • Thermodynamics | 5 LP |
| • Manufacturing Engineering | 5 LP |
| • Electrical Engineering, Computer Science, Measurement and Control Engineering | 15 LP |

- (2) The degree must have been completed with an overall grade of at least 2.5 (or an equivalent foreign degree grade).
- (3) In addition to the requirements specified in Section § 5 of the general provisions, the following additional admission requirement applies:

Applicants must provide proof of English language proficiency at level B2 of the Common European Framework of Reference for Languages (CEFR). This requirement can be met through:

- a school leaving certificate (Abitur) explicitly stating level B2, or evidence that English was studied as a continuous foreign language for at least seven years with at least satisfactory results,
 - a bachelor's degree obtained in an English-speaking country (countries are considered English-speaking for this purpose if English is both the official language and the medium of instruction) or from an accredited English-language programme in Germany,
 - TOEFL with a minimum score of 585 (paper-based) or 87 (internet-based),
 - Cambridge First Certificate in English with at least a grade of B,
 - IELTS with a minimum score of 6.5,
- or another test with a comparable level and result.

- (4) In contrast to § 5 of the General Provisions, German language proficiency is not required.
- (5) International applicants who are not considered equivalent to German applicants under international agreements must demonstrate their academic aptitude through the results of a GRE Revised General Test. A minimum score of 157 in the Quantitative Reasoning section and at least 4.0 in the Analytical Writing section is generally required. If the degree obtained under § 35 (1) was completed with an excellent grade, proof of the GRE Revised General Test is not required. Applicants with a German higher education entrance qualification or a German degree under § 35 (1) are exempt from this requirement.

§ 36 Structure, course content, and modules

- (1) The master's degree programme consists of compulsory modules worth 100 credits (LP) and elective modules worth 20 credits (LP).

(2) The following modules must be completed in the master's degree programme in Additive Manufacturing:

1. Plastics technologies in additive manufacturing (5 LP) (compulsory module)
2. Materials science of metals (5 LP) (compulsory module)
3. 3D-metal printing (5 LP) (compulsory module)
4. Introduction to additive manufacturing & manufacturing technology (6 LP) (compulsory module)
5. Materials science of plastics (5 LP) (compulsory module)
6. Powder technology (5 LP) (compulsory module)
7. Structure optimization (5 LP) (compulsory module)
8. Design rules for additive manufacturing (5 LP) (compulsory module)
9. Product creation (5 LP) (compulsory module)
10. Standard software application development (5 LP) (compulsory module)
11. 4 technical elective modules (5 LP each)
12. Industrial internship (12 LP) (compulsory module)
13. Research paper (*Studienarbeit*) (12 LP) (compulsory module)
14. Final module master's thesis (*Abschlussmodul Masterarbeit*) (25 LP) (compulsory module).

(3) The catalogue of elective modules is listed in the appendix.

§ 37

Repetition of graded examinations (*Prüfungsleistungen*) and withdrawal from modules

- (1) Each module examination or module examination element may be repeated twice. A module is considered definitively failed if the module examination or module examination element can no longer be repeated.
- (2) A technical elective module may be changed once by selecting another module from the same catalogue. This also applies if the originally chosen elective module has been definitively failed.

§ 38

Entry into force and publication

- (1) These special provisions shall enter into force on 1 October 2025.
- (2) These special provisions shall be published in the Official Announcements of Paderborn University (AM.Uni.Pb.).
- (3) In accordance with Section § 12 (5) of the Higher Education Act (HG), one year after the publication of these regulations, procedural or formal violations of the Higher Education Act or other statutory regulations of the university may no longer be asserted unless:
 1. the regulations were not duly published,
 2. the Executive Board (*Präsidium*) had objected to the decision of the body adopting the regulations in advance,
 3. the formal or procedural defect was notified to the university in advance and the violated legal provision and the fact giving rise to the defect were specified, or
 4. no reference was made to the legal consequences of the exclusion of complaints in the public announcement of the regulations.

Issued on the basis of the decisions of the faculty council of the Faculty of Mechanical Engineering on 22 January 2025, following a legal review by the Executive Board of Paderborn University on 19 February June 2025.

Paderborn, 20 May 2025

The President
of Paderborn University
Professor Dr. Matthias Bauer