HOCHSCHULE RHEIN-WAAL
Rhine-Waal University of Applied Sciences

# Examination Regulations

for

## Engineering, B.Sc.

at Rhine-Waal University of Applied Sciences

From 18 February 2025

**Contents**

## Section 1
## Scope

These examination regulations apply to the bachelor's degree programme Engineering, offered in English at the Faculty of Technology and Bionics of Rhine-Waal University of Applied Sciences, in conjunction with the General Examination Regulations ("RPO") of Rhine-Waal University of Applied Sciences. They govern the full-time, seven-semester mode of study.

## Section 2
## Academic objectives; purpose of examination; degree awarded

(1) The bachelor's examination (*Bachelorprüfung*) forms the basis for the professionally qualifying nature of this bachelor's degree. The academic aims and objectives of this degree programme are outlined in Section 3 RPO.

(2) The academic degree "Bachelor of Science", abbreviated as "B.Sc.", is awarded for successfully completing the bachelor's examination.

(3) One of the specialisation paths defined in Annex 3 can be included on the graduation certificate if the graduate has successfully completed all accompanying requirements.

## Section 3
## Admission requirements

(1) General admission requirements are defined in Section 4 RPO.

(2) Applicants are ineligible for admission if they have failed the final attempt at a mandatory examination in a previous degree programme that was very similar content-wise to this degree programme and offered by a university subject to German Basic Law.

(3) Section 4 (5a) RPO governs English language proficiency requirements.

(4) Proof of completion of an Online Self-Assessment (OSA) is required for enrolment.

## Section 4
## Basic internship

Proof of completion of a basic internship within the meaning of Section 4 (3) RPO is not required.

## Section 5
## Programme Structure; Volume of Instruction Hours; Progression of Studies

(1) The total volume of instruction for this degree programme is 134 credit hours (CH, or *SWS* in German).

(2) The modules of this degree programme comprise a total of 210 credits in accordance with the ECTS framework defined in Section 6 (5) RPO.

(3) Additional information about the breakdown of this degree programme and the type, form and scope of modules is available in the study and examination plan in the annex. Additional information about learning outcomes, qualification aims, contents and forms of examination is available in the module guide, which is available for viewing in the faculty's central office.

(4) Students must first pass the examination for the module "Mentoring" in their first three semesters of study before they can be admitted to any modules from the fourth semester or later. As a rule, students may only sit for module examinations if they have successfully completed all prerequisites for the module. These prerequisites generally involve successfully completing specific modules from previous semesters. The prerequisites for each module are set forth in Annex 2.

(5) Students must commit to two specialisation paths from the second semester of study onwards. Of these, at least one technical specialisation path must be completed fully.

(6) For the elective module "Foreign Language", students can generally choose any language course offered, provided the selected course is not in their native language.

(7) The faculty reserves the right to change the contents of the electives listed in the curriculum. The contents of each elective are described in the currently published module guide.

## Section 6
## Internship semester; study abroad semester

(1) Internship semester requirements are defined in Section 21 RPO. Support for students in finding an internship or the option of an applied project at the university in lieu of an internship semester are excluded for this degree programme in accordance with Section 21 (4) sentence 4 RPO.

(2) The study abroad semester is governed by Section 22 RPO. Deviating from Section 22 (5) and (7) RPO, the following requirements apply to study abroad semesters: Students planning a study abroad semester must complete modules/courses worth a minimum of 20 credits (or the full-time equivalent of the host university). The study abroad semester can only be recognised in full if at least 20 credits (or the full-time equivalent) were successfully earned and this is confirmed by an official certificate from the host university. Students who earn fewer than the minimum of 20 credits, but at least 15 credits, must earn at least 5 additional credits at Rhine-Waal University of Applied Sciences to make up for the difference and receive full recognition for the study abroad semester.

(3) The study abroad semester is considered failed if fewer than 15 credits were obtained.

(4) Students planning a study abroad semester must conclude a learning agreement which clearly defines the modules they intend to complete at the host university.

(5) If a student is unable to adhere to the learning agreement for reasons beyond their control, the Examination Board will decide on the recognition of other courses/modules.

## Section 7
## Scope of examinations

(1) The time allotted to students for a written examination is based on the number of obtainable credits and will not exceed 120 minutes. As a rule, 30 minutes will be allotted for each credit point.

(2) The length of an oral exam is approximately 30 minutes per person, but should be at least 20 and no more than 45 minutes.

(3) The scope of assignments, term papers and projects will be decided by the examiner, but should generally not exceed 3000 words (approx. 10 pages, DIN A4).

## Section 8
## Scope and form of the thesis

(4) The main text portion of the thesis should generally be between 15,000 words (approx. 50 pages, DIN A4) and 20,000 words (approx. 70 pages, DIN A4) in length. The thesis may also be supplemented with other media, provided their use as additional documentation is appropriate and helpful within the context of the assigned task. In this case, the length of the text portion of the thesis may deviate from the aforementioned minimum requirement.

(5) The thesis can also be submitted as group work if each student's individual contribution fulfils the requirements set forth in Section 23 (1) RPO and is clearly distinguishable (and thus assessable) due to clear and distinct delimitation by sections, page numbers or other criteria.

## Section 9
## Admission to the thesis and colloquium

(1) In addition to the thesis admission requirements defined under Section 24 (1) RPO, students must also have obtained at least 183 credits of modules, including the module "Group Project".

(2) In addition to the colloquium admission requirements defined under Section 27 (2) RPO, students must have obtained 207 CP.

## Section 10
## Credit values for the thesis and colloquium

(1) Twelve credits are awarded for passing the thesis.

(2) Three credits are awarded for passing the colloquium.

## Section 11
## Conferral of the bachelor's degree

The academic degree specified in Section 2 (2) is officially conferred upon issuing the bachelor's degree certificate defined in Section 30 (1) RPO.

## Section 12
## Entry into force

These examination regulations will enter into force on the day after publication in the Official Notices of Rhine-Waal University of Applied Sciences. They apply to students who first enrolled in the Engineering, B.Sc. at the Faculty of Technology and Bionics of Rhine-Waal University of Applied Sciences in or after winter semester 2025-26.

*Note: These regulations entered into force in their present version on 25 March 2025.*

## Annex 1: Curriculum

| Modulcode | Modulname | CP | SWS | V | Ü | S | P | Proj | Prüfungsform | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Testat | Benotet |
| ***Semester 1*** | | | | | | | | | | |
| 2400 | Mathematics 1 | 6 | 6 | 4 | 2 | | | | | x |
| 2401 | Mechanics | 6 | 4 | 2 | 2 | | | | | x |
| 2402 | Programming | 6 | 4 | 2 | | | 2 | | | x |
| 2403 | Electrical Engineering 1 | 6 | 4 | 2 | 1 | | 1 | | | x |
| 2404 | Fundamentals of Business and Management | 6 | 4 | 2 | 2 | | | | | x |
| 2405 | Mentoring | 1 | speziell | | | | | | x | |
| ***Semester 2*** | | | | | | | | | | |
| 2406 | Personal and Social Competence | 6 | 5 | | | 5 | | | x | x |
| 2407 | Mathematics 2 | 6 | 6 | 4 | 2 | | | | | x |
| | Specialisation I | 18 | 12 | | | | | | | x |
| | Specialisation 2 | | | | | | | | | x |
| ***Semester 3*** | | | | | | | | | | |
| 2408 | Project Management | 3 | 1 | | 1 | | | | x | |
| 2409 | Information Competence and Scientific Working | 4 | | | | 3 | | | x | |
| | Specialisation I | 24 | 16 | | | | | | | x |
| | Specialisation 2 | | | | | | | | | x |
| ***Semester 4*** | | | | | | | | | | |
| | Specialisation I | 30 | 20 | | | | | | | x |
| | Specialisation 2 | | | | | | | | | x |
| ***Semester 5*** | | | | | | | | | | |
| | Specialisation I | 30 | 20 | | | | | | | x |
| | Specialisation 2 | | | | | | | | | x |
| ***Semester 6*** | | | | | | | | | | |
| 2410 | Group Project | 8 | | | | | | 6 | x | |
| | *Elective* | 5 | 4 | | | | | | | x |
| 2411 | Internship / Semester Abroad | 15 | | | | | | | x | |
| ***Semester 7*** | | | | | | | | | | |
| 2411 | Internship / Semester Abroad | 15 | | | | | | | x | |
| 2412 | Bachelor Thesis | 12 | | | | | | | | x |
| 2413 | Colloquium | 3 | | | | | | | | x |

**Explanations**

Regarding the module “Internship / Semester Abroad”: If an internship is chosen, it must be 20 weeks long. If a study abroad semester is chosen, students must complete a full semester at a university abroad.

## Annex 2: Module overview, with prerequisites

| Module Code | Module | CP | Prerequisite |
|---|---|---|---|
| | | | |
| ***Core modules*** | | | |
| 2400 | Mathematics 1 | 6 | |
| 2401 | Mechanics | 6 | |
| 2402 | Programming | 6 | |
| 2403 | Electrical Engineering 1 | 6 | |
| 2404 | Fundamentals of Business and Management | 6 | |
| 2405 | Mentoring | 1 | |
| 2406 | Personal and Social Competence | 6 | |
| 2407 | Mathematics 2 | 6 | |
| 2408 | Project Management | 3 | |
| 2409 | Information Competence and Scientific Working | 4 | |
| 2410 | Group Project | 8 | 3002 Project Management, all Core Modules from semesters 1 and 2 |
| 2411 | Internship / Semester Abroad | 30 | 90 CP in the respective courses |
| 2412 | Bachelor's Thesis | 12 | 183 CP in the respective courses (including 2410 Group Project) |
| 2413 | Colloquium | 3 | 207 CP in the respective courses |
| | | | |
| *Specialisation path (technical):* ***Electronics*** | | | |
| **2414** | Electrical Engineering 2 | 6 | |
| **2415** | Digital Electronics | 6 | |
| **2416** | Physics | 6 | |
| **2417** | Microcontrollers | 6 | 3033 Programming |
| **2418** | Analog Electronics | 6 | 3005 Electrical Engineering 1 |
| 2419 | Drives and Power Electronics | 6 | 3000 Mathematics 1<br>3005 Electrical Engineering 1<br>3032 Mechanics |
| 2420 | Metrology and Sensors | 6 | 3005 Electrical Engineering 1<br>3015 Physics |
| 2421 | Design and Manufacturing of Electronics | 6 | 3005 Electrical Engineering 1 |
| 2422 | Practical Electronics | 6 | 3008 Analog Electronics<br>3009 Microcontrollers |
| | | | |
| *Specialisation path (technical):* ***Information and Communication Technology*** | | | |
| 2414 | Electrical Engineering 2 | 6 | |
| 2415 | Digital Electronics | 6 | |
| 2416 | Physics | 6 | |
| 2417 | Microcontrollers | 6 | 3033 Programming |
| 2418 | Analog Electronics | 6 | 3005 Electrical Engineering 1 |
| 2423 | Signal Processing | 6 | 3000 Mathematics 1<br>3005 Electrical Engineering 1 |
| 2424 | Embedded Systems | 6 | 3033 Programming |
| 2425 | Communication Technology | 6 | |
| 2426 | Networks and Security | 6 | 3009 Microcontrollers |

| | | | |
|---|---|---|---|
| *Specialisation path (technical):* ***Robotics*** | | | |
| 2427 | Dynamics | 6 | 3000 Mathematics 1;<br>3032 Mechanics |
| 2428 | Statistical Learning | 6 | 3000 Mathematics 1<br>3033 Programming |
| 2429 | Modelling and Numerical Simulation | 6 | 3001 Mathematics 2;<br>3032 Mechanics |
| 2430 | Machine Learning | 6 | 3001 Mathematics 2<br>3033 Programming |
| 2431 | System Theory and Controls | 6 | 3000 Mathematics 1;<br>3001 Mathematics 2 |
| 2432 | Multibody Dynamics | 6 | 3033 Programming;<br>3038 Dynamics |
| 2433 | Robot Intelligence | 6 | 3034 System Theory and Controls<br>3039 Statistical Learning |
| 2434 | Robots Kinematics | 6 | 3001 Mathematics 1; 3005 Electrical Engineering 1; 3032 Mechanics; 3038 Dynamics |
| | | | |
| *Specialisation path (technical):* ***Sustainable Product Creation*** | | | |
| **2435** | Manufacturing Technology and Factory Equipment | 6 | |
| 2436 | Metallic Materials and Testing | 6 | |
| 2437 | 3D Product Specification | 6 | |
| 2438 | Non-metallic Materials | 6 | |
| 2439 | Materials Technology | 6 | 3032 Mechanics |
| 2440 | Corrosion and Colloids | 6 | |
| 2441 | Additive Manufacturing | 6 | |
| 2442 | Product Development | 6 | |
| | | | |
| *Specialisation path (economic):* ***Entrepreneur- and Leadership*** | | | |
| 2443 | Civil & Corporate Law | 6 | |
| **2444** | Accounting | 6 | |
| **2445** | Statistics and Probability | 6 | 3000 Mathematics 1<br>3033 Programming |
| 2446 | B2B Marketing and Sales | 6 | 3020 Fundamentals of Business and Management |
| **2447** | Operations Research and Data Analytics | 6 | 3000 Mathematics 1<br>3033 Programming |
| 2448 | Technology and Innovation Management | 6 | 3020 Fundamentals of Business and Management |
| 2449 | Business Performance Management | 6 | 3021 Accounting |
| **2450** | General Management | 6 | 3021 Accounting |
| | | | |
| *Specialisation path (economic):* ***Business Operations*** | | | |
| 2435 | Manufacturing Technology and Factory Equipment | 6 | |
| 2444 | Accounting | 6 | |
| 2445 | Statistics and Probability | 6 | 3000 Mathematics 1<br>3033 Programming |
| 2451 | Sustainability, Quality and Business Process Management | 6 | |

| | | | |
|---|---|---|---|
| 2447 | Operations Research and Data Analytics | 6 | 3000 Mathematics 1<br>3033 Programming |
| 2452 | Production and Supply Chain Management | 6 | |
| 2453 | Technical Investment Planning and Purchasing | 6 | 3002 Project Management<br>3021 Accounting |
| 2450 | General Management | 6 | 3021 Accounting |
| | | | |
| ***Electives*** | | | |
| 2460 | Sustainable Electronics | 5 | 3005 Electrical Engineering 1 |
| 2461 | Low Power Design | 5 | 3005 Electrical Engineering 1 |
| 2462 | Hardware Programming | 5 | 3009 Microcontrollers |
| 2463 | Advanced Communication Technologies | 5 | 3005 Electrical Engineering 1<br>3006 Electrical Engineering 2 |
| 2464 | Renewable Energy and Storages | 5 | 3005 Electrical Engineering 1<br>3015 Physics |
| 2465 | Optoelectronics | 5 | 3008 Analog Electronics |
| 2466 | Biomedical Electronics | 5 | 3010 Signal Processing |
| 2467 | Audio and Speech Processing | 5 | 3000 Mathematics 1<br>3033 Programming |
| 2468 | Electrical Testing and Compliance | 5 | 3005 Electrical Engineering 1 |
| 2469 | Brain-Computer Interfaces | 5 | 3010 Signal Processing |
| 2470 | Computation and Simulation of electromagnetic fields and waves | 5 | |
| 2471 | Materials of Electrical Engineering | 5 | |
| 2472 | Contemporary Issues of Information and Communication Technology | 5 | |
| 2473 | Contemporary Issues of Robotics | 5 | |
| 2474 | Contemporary Issues of Electronics | 5 | |
| 2475 | Contemporary Issues of Production and Supply Chain Management | 5 | |
| 2476 | Modern Physics | 5 | |
| 2477 | Hydraulics | 5 | |
| 2478 | Drive Technology | 5 | |
| 2479 | Applied Manufacturing Technology | 5 | |
| 2480 | Leadership | 5 | 3003 Personal and Social Competence |
| 2481 | Entrepreneurship | 5 | |
| 2482 | Numerical Mathematics | 5 | 3000 Mathematics 1<br>3001 Mathematics 2 |
| 2483 | Inner Engineering | 5 | A personalised pre-program, preliminary meeting and interview with your lecturer |
| 2484 | Microelectronic Control Systems | 5 | |
| 2485 | Joining and Coating Technology | 5 | |
| 2486 | Nanomaterials | 5 | |
| 2487 | Bioplastics | 5 | |
| 2488 | Bioglasses and Ceramics | 5 | |
| 2489 | Smart Materials | 5 | |
| 2490 | FEM Failure Analysis | 5 | |
| 2491 | Advanced Programming Concepts | 5 | |

**Annex 3: Permitted specialisation paths with corresponding subject area combinations**

Designated technical specialisation paths are:

- *Electronics*
- *Information and Communication Technology*
- *Robotics*
- *Sustainable Product Creation*

The corresponding modules and their intended semester of completion are outlined in the diagrams below.

Designated economic specialisation paths are:

- *Business Operations*
- *Entrepreneur- and Leadership*

The corresponding modules and their intended semester of completion are outlined in the diagrams below.

Special combinations of technical and economic specialisation paths can be distinguished on the graduation certificate.

- Specialisations in *Electronics* and *Information and Communication Technology* result in the degree *B.Sc. in Electrical Engineering*.
- A specialisation in *Robotics* combined with a specialisation either in *Electronics* or *Information and Communication Technology* results in the degree *B.Sc. in Mechatronics*.
- A specialisation in one of the four technical specialisation paths in combination with one of the two economic specialisation paths results in the degree *B.Sc. in Business Engineering*.

Choosing a different combination of specialisations, or not fully completing the requirements of a specialisation path, will not result in a distinguishing title on the graduation certificate. Instead, students will earn the degree *B.Sc. in Engineering*.

**Vertiefung:** Electronics

| Semester | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Mathematics 1 2400 | Mechanics 2401 | Programming 2402 | Electrical Engineering 1 2403 | Fundamentals of Business and Management 2404 | Mentoring 2405 |
| 2. | Personal and Social Competence 2406 | Mathematics 2 2407 | Electrical Engineering 2 2414 | Digital Electronics 2415 | Physics 2416 | |
| 3. | Project Management 2408 / Information Competence and Scientific Working 2409 | Microcontrollers 2417 | Analog Electronics 2418 | Drives and Power Electronics 2419 | | |
| 4. | | Metrology and Sensors 2420 | Design and Manufacturing of Electronics 2421 | | | |
| 5. | | Practical Electronics 3014 | | | | 1037 Module |
| 6.1. | Group Project 2410 | | | Elective | | |
| 6.2. | Internship (partial credit) 2411 | | | | | |
| 7. | Internship (partial credit) 2411 | | Bachelor Thesis 2412 | | Colloquium 2413 | |

**Vertiefung:** Information and Communication Technology

| Semester | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Mathematics 1 2400 | Mechanics 2401 | Programming 2402 | Electrical Engineering 1 2403 | Fundamentals of Business and Management 2404 | Mentoring 2405 |
| 2. | | Mathematics 2 2407 | Electrical Engineering 2 2414 | Digital Electronics 2415 | Physics 2416 | |
| 3. | Personal and Social Competence 2406 | Microcontrollers 2417 | Analog Electronics 2418 | Signal Processing 2423 | | |
| 4. | | Embedded Systems 2424 | Communication Technology 2425 | | | |
| 5. | Project Management 2408 / Information Competence and Scientific Working 2409 | Networks and Security 2426 | | | | |
| 6.1. | Group Project 2410 | | | Elective | | |
| 6.2. | Internship (partial credit) 2411 | | | | | |
| 7. | Internship (partial credit) 2411 | | Bachelor Thesis 2412 | | Colloquium 2413 | |

**Vertiefung:** Robotics

**Semester**

| | | | | | |
|---|---|---|---|---|---|
| 1. | Mathematics 1 2400 | Mechanics 2401 | Programming 2402 | Electrical Engineering 1 2403 | Fundamentals of Business and Management 2404 | Mentoring 2405 |
| 2. | Personal and Social Competence 2406 | Mathematics 2 2407 | | | | |
| 3. | Project Management 2408 / Information Competence and Scientific Working 2409 | Dynamics 2427 | Statistical Learning 2428 | | | |
| 4. | | Modelling and Numerical Simulation 2429 | Machine Learning 2430 | System Theory and Controls 2431 | | |
| 5. | | Multibody dynamics 2432 | Robot Intelligence 2433 | Robots Kinematics 2434 | | |
| 6.1. | Group Project 2410 | | | Elective | | |
| 6.2. | Internship (partial credit) 2411 | | | | | |
| 7. | Internship (partial credit) 2411 | | Bachelor Thesis 2412 | | Colloquium 2413 | |

**Vertiefung:** Sustainable Product Creation

**Semester**

| | | | | | |
|---|---|---|---|---|---|
| 1. | Mathematics 1 2400 | Mechanics 2401 | Programming 2402 | Electrical Engineering 1 2403 | Fundamentals of Business and Management 2404 | Mentoring 2405 |
| 2. | Personal and Social Competence 2406 | Mathematics 2 2407 | | Manufacturing Technology and Factory Equipment 2435 | Metallic Materials and Testing 2436 | |
| 3. | Project Management 2408 / Information Competence and Scientific Working 2409 | | | 3D Product Specification 2437 | Non-metallic Materials 2438 | |
| 4. | | | | Materials Technology 2439 | Corrosion and Colloids 2440 | |
| 5. | | | | Additive Manufacturing 2441 | Product Development 2442 | |
| 6.1. | Group Project 2410 | | | Elective | | |
| 6.2. | Internship (partial credit) 2411 | | | | | |
| 7. | Internship (partial credit) 2411 | | Bachelor Thesis 2412 | | Colloquium 2413 | |

**Vertiefung:** Business Operations

| Semester | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Mathematics 1 2400 | Mechanics 2401 | Programming 2402 | Electrical Engineering 1 2403 | Fundamentals of Business and Management 2404 | Mentoring 2405 |
| 2. | Personal and Social Competence 2406 | Mathematics 2 2407 | | Manufacturing Technology and Factory Equipment 2435 | Accounting 2444 | |
| 3. | Project Management 2408 / Information Competence and Scientific Working 2409 | | Statistics and Probability 2445 | Sustainability, Quality and Business Process Management 2451 | | |
| 4. | | | Operations Research and Data Analytics 2447 | Production and Supply Chain Management 2452 | | |
| 5. | | | | Technical Investment Planning and Purchasing 2453 | General Management 2450 | |
| 6.1. | Group Project 2410 | | | Elective | | |
| 6.2. | Internship (partial credit) 2411 | | | | | |
| 7. | Internship (partial credit) 2411 | | Bachelor Thesis 2412 | | Colloquium 2413 | |

**Vertiefung:** Entrepreneur- and Leadership

| Semester | | | | | | |
|---|---|---|---|---|---|---|
| 1. | Mathematics 1 2400 | Mechanics 2401 | Programming 2402 | Electrical Engineering 1 2403 | Fundamentals of Business and Management 2404 | Mentoring 2405 |
| 2. | Personal and Social Competence 2406 | Mathematics 2 2407 | | Civil & Corporate Law 2443 | Accounting 2444 | |
| 3. | Project Management 2408 / Information Competence and Scientific Working 2409 | | Statistics and Probability 2445 | B2B Marketing & Sales 2446 | | |
| 4. | | | Operations Research and Data Analytics 2447 | Technology and Innovation Management 2448 | | |
| 5. | | | | Business Performance Management 2449 | General Management 2450 | |
| 6.1. | Group Project 2410 | | | Elective | | |
| 6.2. | Internship (partial credit) 2411 | | | | | |
| 7. | Internship (partial credit) 2411 | | Bachelor Thesis 2412 | | Colloquium 2413 | |

Example of a combination of specialisations

| Vertiefung: | Information and Communication Technology / Robotics | | | | | |
|---|---|---|---|---|---|---|
| Semester | | | | | | |
| 1. | Maths 1 | Mechanics | Programming | Electrical Engineering 1 | Fundamentals of Business and Management | Mentoring |
| 2. | Social and Personal competence | Maths 2 | Electrical Engineering 2 | Digital Electronics | Physics | |
| 3. | Dynamics | Microcontrollers | Analog Electronics | Signal Processing | Statistical Learning | |
| 4. | Modelling and Numerical Simulation | Embedded Systems | Communication Technology | Machine Learning | System Theory and Controls | |
| 5. | Project Management / Information competence and scientific working | IT-Security | Multibody dynamics | Robot Intelligence | Robots Kinematics | |
| 6.1. | Group Project | | | Elective | | |
| 6.2. | Internship (partial credit) | | | | | |
| 7. | Internship (partial credit) | | Thesis | | Colloquium | |