



Examination and Study Regulations
for the Master's Programme
Digitalization & Sustainability in Materials Science & Engineering
at the University of Bayreuth
dated 25 September 2024

Article 9 sentence 1 in conjunction with Article 80 para 1 sentence 1 and Article 84 para 2 sentence 1 BayHIG forms the framework for the following regulations issued by the University of Bayreuth.

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§ 1

Purpose of the master's examination

¹The master's examination as the conclusion of the university studies in the master's programme Digitalization & Sustainability in Materials Science & Engineering determines whether the student has acquired the specialized knowledge and competencies provided for in the present examination and study regulations in the following areas:

1. Material development for sustainable applications using digital methods
2. Concepts for the substitution of existing, non-sustainable materials
3. Evaluation of existing material cycles and creation of circular economy concepts
4. Development of sustainable technologies and materials
5. Thinking in terms of sustainability principles and understanding the links between digitalisation, sustainability and materials science

and [also determines] whether he or she has the ability to work independently using known methods from engineering and computer science. ²It is also determined whether he or she has an overview of specialist and interdisciplinary contexts in the field of materials science, sustainability and digitalization to such an extent that he or she is capable of largely independent scientific work. ³The master's programme Digitalization & Sustainability in Materials Sciences & Engineering, including all examinations, is conducted in English. ⁴The University, by way of the Faculty of Engineering Science, awards the academic degree Master of Science (abbreviated M.Sc.) for successful completion of the master examination.

§ 2

Admission to the programme; qualification

(1) Admission prerequisites for the master's programme are as follows.

1. a university degree in the bachelor's programme Materials Science and Engineering or Engineering Science at the University of Bayreuth or a degree equivalent thereto (according to Annex 2);
2. proof of English skills at level B2 or better of the Common European Framework of Reference for Languages for applicants who neither earned their higher education entrance qualification nor their initial degree in the English language.
3. proof of German language skills at level A1 or better of the Common European Framework of Reference for applicants who neither earned their higher education entrance qualification nor an initial degree in the German language; Applicants who do not meet

this requirement will be enrolled on the condition that they submit the proof of the required language proficiency by the end of their second semester of study at latest.

4. the subject-specific aptitude assessment process for the degree programme in accordance with Annex 3.
- (2) ¹The qualifications may not differ substantially in terms of the earned competences from the qualifications referred to in para 1 number 1. ²If there are substantial compensable differences, applicants may be admitted subject to the proviso that, in addition to the assessment components to be completed in the master's programme, they also successfully complete coursework and examinations in the amount of up to 30 ECTS points in the bachelor's programme in Materials Science & Engineering Engineering Science studies by the end of the second semester of study at latest; otherwise, the prerequisites for admission to the programme are deemed not to have been fulfilled. ³The provisions of the examination and study regulations for the above-mentioned bachelor's programmes apply. ⁴Art. 86 BayHSchG applies to determining the eligibility of domestic and foreign degrees. ⁵Such decisions as described in sentence 1 to 4 are to be made by the board of examiners established according to § 5.
- (3) ¹If the certificate of the relevant first degree is not yet available, a confirmation with individual grades must be submitted for all examinations and coursework completed up to the registration deadline. ²Such credit for examinations and coursework must amount to a total of at least 150 ECTS points. ³Applicants who meet the requirements according to sentence 2 and have successfully completed the procedure for determining the course-specific aptitude according to Annex 3 will be enrolled on condition that they submit the certificate of the relevant first degree by the end of the second semester.
- (4) Students who are enrolled in the master's programme Digitalization & Sustainability in Materials Sciences & Engineering are considered *ipso facto* to be admitted to the examinations.

§ 3

Structure of studies; standard period of study

- (1) The standard period of study is four semesters, including the examination periods and the master's thesis.
- (2) Mandatory internships/ excursions are integrated into the degree programme and should be completed within the standard period of study.
- (3) A total of 120 credit points (LP) must be earned.
- (4) New students may begin the programme in the winter semester or the summer semester.

§ 4

Components of the programme of study

- (1) The master's degree Digitalization & Sustainability in Materials Science & Engineering is divided into modules and consists of the following module areas, which are listed in more detail in Annex 1:
 1. Compulsory area
 2. Compulsory elective area
 3. Focus area
 4. Research module area
 5. Master's Thesis
- (2) ¹The completion of additional examinations in the module areas Compulsory elective and Focus area beyond the required scope is possible; § 17 para 1 is to be observed. ²There is no obligation to repeat failed examinations taken for the purpose of earning additional credits.

§ 5

Board of examiners

- (1) ¹A board of examiners shall be formed to make the necessary decisions with regard to the admission to the master's programme and the organizational execution of the master's examination. ²The board of examiners shall administer the examination proceedings in accordance with the present regulations and make all decisions with the exception of the examinations and the assessment thereof. ³It shall consist of three members, each having one substitute representative. ⁴The members of the board of examiners and their substitute representatives shall be elected by the faculty council of the Faculty of Engineering Science from among the university professors (Art. 19 para 1 sentence 1 and 3 BayHIG) of the Faculty of Engineering Science for a period of three years. ⁵The board of examiners shall elect a chair and deputy chair from among its members.
- (2) ¹The board of examiners constitutes a quorum if the majority of members are present and entitled to vote after an invitation had been sent to all members at least three days prior to the meeting. ²The decisions taken by the board of examiners in its meetings are to be made on the basis of majority vote. ³Vote abstention, secret voting, and proxy voting are prohibited. ⁴If votes are equally divided among its members, the chair's vote shall be decisive.
- (3) ¹The chair of examiners shall ensure that the provisions of these regulations are followed. ²He or she shall convene the meetings of the board of examiners and shall act as chair of its pro-

ceedings and decisions. ³With regard to matters that cannot be postponed, he or she is authorized to make decisions on behalf of the board of examiners. ⁴He or she must promptly inform the other members of any such decision - at the next meeting at latest. ⁵In addition, unless otherwise provided by the present regulations, the board of examiners can transfer (until revoked) the right to perform other duties of the board to the chair. ⁶The chair can delegate tasks to the members of the board of examiners.

- (4) The board of examiners shall regularly report to the faculty council concerning updates to examination schedules and study periods and may make suggestions for reforming the present regulations.
- (5) ¹Any notices the board of examiners issues under the terms of the present regulations are to be published together with a rationale and information concerning how to appeal. ²Notices of appeal shall be issued by the president in consultation with the board of examiners.

§ 6

Examiners and co-examiners

- (1) ¹Any person authorized to conduct university examinations in accordance with Art. 85 BayHIG and the University Examination Ordinance may become an examiner. ²Any member of the University of Bayreuth who is a graduate of an equivalent or comparable programme of study may serve as co-examiner.
- (2) ¹If a member of the University of Bayreuth who is an authorized examiner leaves the University, he or she may remain an examiner for a reasonable period. ²Authorization to administer examinations shall generally remain valid for up to three years.
- (3) ¹Unless otherwise decided by the chair of examiners, the relevant supervisor shall also serve as examiner. ²If that instructor is not authorized to administer examinations as laid out in sentence 1, the chair of examiners shall appoint an examiner at the beginning of the semester in which the examination is to be held.

§ 7

Disqualification due to personal involvement; confidentiality

- (1) Disqualification from consultation and voting on the board of examiners as well as other activities relating to examinations on the basis of personal involvement is governed by Article 51 para 2 BayHIG.

- (2) The non-disclosure obligation that holds for members of the board of examiners, as well as examiners, co-examiners, and anyone else involved in the examination process is governed by Article 26 para 2 BayHIG.

§ 8

Credit transfer

- (1) The recognition and crediting of competencies shall be determined in accordance with Art. 86 BayHIG.
- (2) ¹If credits are recognized for competencies, the grades are to be carried over and included when calculating the final grade, as long as the grading systems are analogous. ²If the grading system for the competencies to be transferred does not correspond to the grading system given in § 16, the grades received at the other higher education institution are to be converted using the Modified Bavarian Formula:
$$x = 1 + 3 \cdot (N_{\max} - N_d) / (N_{\max} - N_{\min})$$
where x is the grade to be calculated, N_{\max} is the highest possible grade, N_{\min} is the highest passing grade, and N_d is the actual grade; in this calculation, the grade to be calculated is only given to one decimal place and is not adjusted to fit the grading scale given in § 16. ³If a conversion according to sentence 2 is not possible, the board of examiners shall determine a corresponding key for the grade conversion. ⁴If a grade is not available and cannot be determined, the remark "passed" will be entered; in this case, it will not be included in the calculation of the final grade. ⁵The board of examiners in consultation with the relevant representative from the subject area shall decide whether the requirements have been met for credit transfer. ⁶If credit transfer is denied, the person concerned can appeal the decision by submitting a request for the University Governing Board to review the decision within four weeks of notification of denial. ⁷The University Governing Board shall provide the board of examiners with a recommendation on how to proceed with the request.
- (3) Credit transfer/ recognition requests are to be submitted to the board of examiners as soon as possible following enrolment and in any event prior to beginning the examination in the relevant module.
- (4) Paragraphs 2 and 3 shall apply mutatis mutandis to the crediting of competencies, subject to the maximum limit pursuant to Art. 86 para 2 Sentence 2 BayHIG.

§ 9

Times for holding examinations; announcing examination times and examiners

- (1) Examinations will be held once per semester. ²The examination period is generally from the last week of lectures through the first four weeks of semester break.
- (2) ¹If not listed in Annex 1, examination times and the duration of examinations shall be determined by the relevant examiner and announced university-wide at the start of the course. ²An additional examination time may be scheduled for the beginning of the following semester. ³A change of examiner on short notice shall only take place if there are urgent grounds for doing so.
- (3) Students are to register for examinations by the published deadline, according to the process determined by the board of examiners.

§ 10

Elements of the examination

- (1) The master's examination comprises the module examinations listed in Annex 1 and the master's thesis.
- (2) The examinations serve as proof that the student has achieved the respective competence objectives of the individual modules.

§ 11

Forms of examination

- (1) ¹Examinations take the form of written examinations, oral examinations, term papers, written elaborations, presentations, contributions, portfolio examinations and semester tasks. ²The possible forms of examination in the modules are given in Annex 1. ³The permitted aids in examinations are determined by the respective examiner.
- (2) ¹Assessment of examinations is carried out according to the process announced by the board of examiners. ²Notifications will not be sent individually. ³Students are required to familiarize themselves independently with the terms of the present regulations pertaining to repeating examinations; they are responsible for informing themselves of examination results.
- (3) ¹If an examination is assessed by more than one examiner, the grade shall be determined by taking the average of the grades assigned and truncating (not rounding) the number to one decimal digit. ²If a written examination is assessed as "failed" or "unsatisfactory", it must be

assessed by a second examiner. ³ Each examination shall be graded by the examiner either in accordance with §13 (alternative 1) or according to the "pass" or "fail" grading system (alternative 2). ⁴ If alternative 2 of sentence 3 applies, the examination result shall not factor into the final grade. ⁵ In case of a failing grade, the regulations for repeating examinations in § 19 shall apply.

- (4) ¹ Written examinations are to be between one and two hours in duration. ² A written record of the examination is to be made. ³ The invigilator shall confirm the accuracy of the record by providing his or her signature. ⁴ The examination record sheet is to include all aspects of the examination that are relevant to determining the grade. ⁵ An assessment of each written examination shall be provided no later than eight weeks after the examination.
- (5) ¹ If a student arrives to the examination late, he or she shall not be given additional time to finish the examination. ² Leaving the examination room is permitted with the authorization of the invigilator. ³ The time and duration of absence are to be noted on the question paper.
- (6) ¹ Oral examinations are to be held over a period of 30 to 60 minutes, depending on the requirements of the particular course. ² Oral examinations are administered by two examiners or one examiner and one co-examiner. ³ In agreement with the candidate, the examiner may conduct an oral examination in German. The examination can be conducted in groups of no more than four students. ⁵ If an examination is conducted in groups, it shall be held over a period of no longer than 90 minutes for the whole group. ⁶ One examiner or the co-examiner shall complete an examination record sheet for the oral examination that includes the following: The location, start time, and duration of the examination, examination subject-matter and results, names of the examiner and co-examiner, name of the student, and any noteworthy incidents. ⁷ The record sheet is to be signed by the two examiners or by the examiner and co-examiner.
- (7) ¹ In the case of an oral examination, students who intend to take the same examination within the next two semesters are given preference as listeners, within the limits of the space available. ⁶ By way of the examiner or at the student's request, members of the audience may be excluded. ³ Discussion and announcement of the examination results (grade) shall not be conducted in public.
- (8) ¹ Papers of ten to thirty pages are written following the underlying course. ² The topic is to be assigned by the relevant examiner in consideration of the student's request. ³ The time limit for term papers shall be four weeks. ⁴ The topic of the term paper must be such that it can be completed within this period. ⁵ The chair of examiners may extend this deadline by up to one week at the request of the student and after having heard the supervisor in case of reasons beyond the candidate's control. ⁶ If the student proves by means of a medical certificate that he or she is prevented from working on the thesis due to illness, the processing time shall be suspended

in accordance with the period of illness determined by the doctor. ⁷The paper must be submitted to the examiner in electronic form as a PDF and/or in paper form. ⁸If the deadline is not met, the term paper will be assessed as "insufficient".

- (9) ¹Written elaborations are written documentation comprising between 15 and 40 pages, depending on the requirements of the associated course. ²The examiner shall communicate the form and scope of the assignment and the deadline to the students at the beginning of the course. ³Paragraph 8 sentences 5 to 8 apply *mutatis mutandis*.
- (10) ¹In the case of presentations, the topic, type of writing (if applicable), duration, deadline and scope must be clarified with the respective examiner. ²The duration of a presentation can be 15 to 30 minutes, depending on the amount of work involved. ³If the presentation is graded, the examiner shall determine the grade on the basis of the oral presentation and, if applicable, the accompanying written material.
- (11) ¹In a portfolio examination of a module, mutually related performances (partial examinations) on the same examination subject are performed as specified by the examiners. ²The individual partial examination performances can be written, oral and/or practical performances (according to para 4, 6, 8, 9, 10, 12, 13), which in their entirety form the module examination for the module in question. ³The subject of the assessment of a portfolio examination is all partial examinations in accordance with § 16 para 2.
- (12) ¹Contributions (e.g. tests, internship reports, posters) serve as proof of competence acquisition in lecture-accompanying courses (e.g. internships) and are a written presentation of subject content according to specified criteria. ²The form, deadline and scope of the assignment as well as the assessment criteria must be announced to the students by the respective examiner at the beginning of the course. ³Paragraph 8 sentences 4 to 6 apply *mutatis mutandis*.
- (13) ¹Semester-related tasks in the form of written and/or oral and/or practical work (e.g. working on exercise sheets, programming exercises, reading cards) are set and completed during the module and are carried out as individual or group work. ²The individual components are completed during or at the end of the semester and together form the module examination for the relevant module. ³The examiner shall communicate the form and scope of the assignment to the students at the beginning of the course.

§ 12

Master's thesis

- (1) ¹In the master's thesis, the student should demonstrate that he or she is able to work independently and with the aid of suitable resources on a topic in the subject using scientific meth-

ods and present it in writing in an appropriate manner. ²The master's thesis is a written elaboration on a current topic from the field of materials science in connection with digitalisation or sustainability. ³The topic may include interdisciplinary issues.

- (2) ¹The chair of examiners shall appoint two reviewers (in accordance with § 6), if possible taking into account the student's wishes. ²The topic of the master's thesis is issued by the first reviewer of the relevant subject from the Faculty of Engineering Sciences via the chair of examiners. ³With the approval of the board of examiners, it may also be carried out outside the faculty at other institutes within the University of Bayreuth if it is supervised there by an authorised examiner in accordance with sentence 1. ⁴Record is to be made of the date on which the topic was assigned. ⁵It is recommended that the master's thesis be completed in the fourth semester.
- (3) ¹The master's thesis is integrated into the course of study and comprises a workload of 900 hours including presentation. ²The master's thesis is to be submitted no later than six months after the topic was assigned. ³In cases where the student is not responsible for exceeding the deadline, the chair of examiners may extend the submission deadline by a maximum of 12 weeks at the request of the student after consulting the first reviewer; the request must be submitted before the deadline for submitting the master's thesis. ⁶If the student proves by means of a medical certificate that he or she is prevented from working on the thesis due to illness, the processing time shall be suspended in accordance with the period of illness determined by the doctor. ⁵Theses that are not submitted by the stated deadline are graded as "*nicht ausreichend*" ["unsatisfactory"].
- (4) ¹The master's thesis must be submitted in English. ²The master's thesis shall contain a statement at the end in which the author confirms that he or she wrote the thesis independently and did not make use of any sources or materials that are not cited in the thesis. It shall also be confirmed that the thesis had never before been submitted toward fulfilment of an academic degree. ³The master's thesis must include a table of contents and a list of sources.
- (5) ¹The master's thesis must be submitted in electronic form (printable PDF document) by the deadline. ²Submission is carried out by uploading the document via the form server. ³The Examinations Office will make a note of the date on which the thesis was submitted.
- (6) Up to two copies of the master's thesis in typewritten form, bound and paginated, must also be submitted to the examiners by the deadline at the request of the first examiner.
- (7) ¹The student may return the topic to the board of examiners once within the first two weeks. ²Paragraphs 1 to 6 also apply when assigning and working on a new topic.
- (8) ¹Examinations Office shall forward the thesis to the reviewers appointed. ²The grades shall be made available no later than two months after submission of the thesis. ³Each assessor shall provide a recommendation as to whether the thesis is to be accepted or rejected and assign a

grade in accordance with § 16. ⁴If the two grades awarded by the examiners differ by more than one grade, the board of examiners may consult another examiner. ⁵The content of the master's thesis must be presented to the examiners in a 20-minute presentation, which is graded by the examiners in accordance with § 16. ⁶The grades of the two examiners are averaged for the grade of the master's thesis. ⁷The two grades for the written paper are weighted threefold and the two grades for the oral presentation are weighted once in the final grade. ⁸It shall only be given to one decimal place; the remaining digits are to be truncated (not rounded). ⁹In this form, the grade of the master's thesis is included in the determination of the overall grade. ¹⁰§ 11 para 2 applies *mutatis mutandis*.

- (9) One copy of the master's thesis is to remain on record.

§ 13

Credit point system

- (1) ¹A record of credit points for completed modules is to be kept by the University of Bayreuth's Examinations Office for each student who is enrolled in the programme of study. ²The credit points that appear on the transcript are identical with credit points as stipulated in the European Credit Transfer System. ³One credit point corresponds to a workload of 30 hours.
- (2) The credit points for the modules are given in Annex 1.

§ 14

Consideration of protective provisions

- (1) ¹The utilization of protection periods of the Maternity Protection Act (MuSchG) shall be guaranteed. ²Upon request, the claiming of parental leave in accordance with the Federal Parental Allowance and Parental Leave Act (Bundeselterngeld- und Elternzeitgesetz), as well as periods for the care of a close relative within the meaning of § 7 para 3 of the Nursing Care Act who is in need of care within the meaning of § 14 and § 15 of the Eleventh Book of the Social Code (Sozialgesetzbuch), shall be guaranteed. ³The appropriate evidence must be furnished; any changes in status are to be reported immediately.
- (2) ¹If duly requested, periods during which study was impossible or only possible to a limited extent for reasons beyond the student's control shall not be taken into account with regard to the examination schedule. ²Corresponding evidence must be furnished; medical certificates must be presented in the case of illness. ³Any changes in status are to be reported immediately.

§ 15

Consideration of special needs of students with disabilities or chronic illness and in special life circumstances

- (1) ¹For the sake of ensuring equal opportunities, the particular needs of examinees with disabilities or chronic illnesses under the terms of the Bavarian Equal Opportunities for Disabled Persons Act are to be appropriately accommodated. ²Upon written request by the student, the board of examiners shall determine on the basis of the degree of disability or chronic illness in what form the examination is to be taken; alternatively, an extension or other reasonable accommodations may be granted. ³Proof of the examination disability or chronic illness must be furnished in the form of a medical certificate stating that, due to a long-term or permanent disability or chronic illness, the examination cannot be taken in whole or in part in the intended form. ⁴The request is to be submitted together with the examination registration. ⁵If the request is submitted later, it shall only be valid for subsequent examinations.
- (2) ¹Students in special circumstances may apply to the board of examiners for reasonable accommodations in examinations in accordance with paragraph 1. ²The board of examiners shall decide on the existence of a special life situation and the extent of reasonable accommodations.

§ 16

Grading of examinations

- (1) The following grading scale will be used in the assessment of the individual assignments and examinations; the digit to the right of the comma enables a more differentiated assessment between the whole-number values.
- | | |
|---|---------------------|
| "sehr gut" (excellent) | = 1,0 or 1,3 |
| "gut" (considerably better than average) | = 1,7 or 2,0 or 2,3 |
| "befriedigend" (average) | = 2,7 or 3,0 or 3,3 |
| "ausreichend" (fulfils the minimum requirements despite deficiencies) | = 3,7 or 4,0 |
| "nicht ausreichend" (unsatisfactory due to considerable deficiencies) | = 5,0 |
- (2) ¹If a greater module examination is made up of multiple examinations, the grade for the module shall be established by calculating the arithmetic mean after weighting the components based on credit points, unless a different weighting is given in Annex 1. ²In this calculation, the grade shall only be given to one decimal place; the remaining digits are to be truncated (not rounded). ³Module grades are as follows:
- | | |
|-----------------------------|------------|
| an average of 1,5 or better | = sehr gut |
|-----------------------------|------------|

an average of 1,6 up to and including 2,5	= gut
an average of 2,6 up to and including 3,5	= befriedigend
an average of 3,6 up to and including 4,0	= ausreichend.

§ 17

Final grade

- (1) ¹The overall grade for the master's examination is calculated by taking the arithmetic mean of the module grades (and the grade for the master's thesis), weighted according to the credit points awarded for each module. ²In this calculation, the grade shall only be given to one decimal place; the remaining digits are to be truncated (not rounded). ³If more credit points are earned in the module areas Compulsory elective area and Focus area than are required, only the best graded modules will be used to calculate the final grade, taking into account the required credit points. ⁴Non-graded modules are only counted after the graded modules for the purpose of obtaining the required credit points. ⁵If the last module still to be taken into account exceeds the credit points of the module area, the assessment of this module will only be included in the calculation of the overall grade on a pro rata basis with the credit points still required.
- (2) As the overall examination grade for a master's examination that was passed, students with an average grade of up to 1.2 receive the grade "excellent", up to 1.5 the grade "very good", up to 2.5 "good", up to 3.5 "satisfactory", up to 4.0 "sufficient".
- (3) The certificate or an attached document shall indicate how the final grade was calculated.
- (4) ¹In addition to the degree certificate, an ECTS grading table will be issued as stipulated in the ECTS guidelines in the version dated 6 February 2009. ²This table displays what percentage of programme graduates in a given time frame received the same final grade as described in para 2. ³Those programme graduates who were awarded their diplomas in the previous four semesters shall serve as the reference group as long as it includes at least 30 persons. ⁴The date of the last examination shall be decisive in assigning graduates to a particular semester. ⁵If the minimum number of graduates is not reached, the number of previous semesters is to be extended until the minimum number is reached. ⁶If the programme of study does not yet have as many graduates as the minimum number required of the reference group, an ECTS grading table will be issued as soon as the minimum number is reached. ⁷For degrees awarded before the minimum number is reached, an ECTS grading table will be issued at a later date upon request once the minimum number has been reached. ⁸The graduate's own graduating class is also to be included in the reference group. ⁹The size of the reference group and the time frame is to be included.

§ 18

Passing the master's examination

- (1) Passing the master's examination requires a grade of "*ausreichend*" ["sufficient"] or "*bestanden*" ["passed"] or better for the master's thesis and each module; in addition, all 120 credit points must be earned and all requirements mentioned in § 2 para 2 must be fulfilled.
- (2) ¹If a student has not met the requirements specified in paragraph 1 by the end of the sixth semester for reasons for which he or she is responsible, the master's examination shall be deemed to have been failed for the first time. ²Examinations that were taken on time and for which the candidate received a passing grade need not be repeated.
- (3) ¹If the missing examinations are not passed by the student within a year of the deadline given in para 2 sentence 1 for reasons under his or her control, or if all possibilities to repeat the examinations have been exhausted, then the candidate shall be considered as having failed the master's examination on the final attempt. ²The deadline shall not take into account periods of leave and periods during which the candidate withdrew from study. ³Notice shall be sent to inform the candidate that he or she has failed the examination on the final attempt in accordance with § 5 para 5 in conjunction with Article 41 BayVwVfG as amended. ⁴The board of examiners may grant the student an extension of the deadline stated in sentence 1 for circumstances beyond his or her control.

§ 19

Repeating examinations

- (1) Any failed examination may be repeated several times within the time limit specified in § 18.
- (2) Voluntarily repeating examinations that were already passed or the master's thesis that was already passed is not permitted.
- (3) ¹The master's thesis can be repeated with a new topic if the student receives a failing grade for the thesis. ²Repeating the master's thesis for a second time is not permitted. ³If a master's thesis that has been started is not passed due to the maximum duration of study according to § 18 para 2, the master's thesis can be continued as a repetition until the scheduled deadline; the student must notify the Examinations Office in writing by the end of the maximum duration of study according to § 18 para 2. ⁴If the master's thesis is then deemed "unsatisfactory", the candidate is considered to have failed the master's examination on the final attempt.
- (4) Administrative measures shall be taken to ensure that it is possible to repeat the failed examinations or a failed master's thesis within six months.

§ 20

Notice of failing the master's examination

Notice shall be sent to inform the candidate that he or she has failed the master's examination on the final attempt in accordance with § 5 para 5 in conjunction with Article 41 BayVwVfG as amended.

§ 21

Access to examination documents

- (1) After completion of the examination procedure, the student may inspect his or her examination papers, the related examination reports and the record sheets.
- (2) ¹Such requests are to be made within six months after the degree certificate is awarded. ²If the student was prevented from complying with the deadline in sentence 1 through no fault of his or her own, Art. 32 BayVwVfG shall apply.

§ 22

Defects in the examination proceedings

- (1) If it becomes apparent that the examination procedure was flawed in a way that influenced the examination result, the respective examination shall be repeated upon application by a student or ex officio.
- (2) Any defects in the examination proceedings are to be reported to the examiner or the chair of examiners without delay, and in general, prior to notice being given of the examination results.
- (3) Claims under the terms of paragraph 1 must be made within six months of the examination's conclusion.

§ 23

Non-appearance, withdrawal from examinations, cheating, and policy violations

- (1) ¹Students who have registered for an examination may withdraw without giving reasons by a date announced by the examination board at the latest. ²An examination is deemed to have been failed if the student does not appear for an examination date for which he or she has registered for reasons for which he or she is responsible or withdraws after the deadline specified in sentence 1.

- (2) ¹The grounds for failing to appear - or as long as paragraph 1 sentence 1 does not apply, for withdrawal must be submitted to the board of examiners without delay and substantiated by *prima facie* evidence. ²The same applies to inability to take the examination due to circumstances arising during the examination. ³Inability to take the examination due to illness must be documented with a medical certificate. ⁴If the board of examiners accepts the reasons given, a new examination time is to be offered under the terms of § 9 within six months.
- (3) If withdrawal or failure to appear is caused by reasons beyond the candidate's control, examinations elements completed up to that point are to be recognized.
- (4) ¹If the student attempts to influence the result of an individual examination by cheating or using unauthorized aids, the examination in question shall be graded as "unsatisfactory". ²A student who significantly disrupts the proper conduct of the examination may be excluded from continuing the examination by the respective examiner or invigilator; in this case, the examination in question is deemed to have been assessed as "unsatisfactory".
- (5) ¹If cheating in the form of plagiarism is detected, the examination will be graded as "*nicht ausreichend*" ["unsatisfactory"]. ²The accusation of plagiarism is justified if the student has attempted to influence the result of the examination in a way that is favourable to him or her by failing to specifically mark passages taken verbatim from other authors and also statements in his or her work that are closely based on the ideas of other authors. ³The determination shall be made by the relevant examiner or invigilator and shall be recorded in the files. ⁴In serious cases or in the case of repetition, the entire module examination can be declared failed and, in particularly serious cases, the right to repeat the examination can also be withdrawn and the entire module examination can be declared failed on the final attempt. ⁵The decision on this is taken by the board of examiners. ⁶In deciding on the imposition of the sanction, both the quantity of the plagiarism and its significance for the work must be assessed in each individual case.

§ 24

Invalidating the master's examination

- (1) If the student has cheated in an examination and this fact only becomes known after the certificate has been issued, the board of examiners may subsequently correct the relevant grades accordingly and declare the master's examination failed in whole or in part.
- (2) If the student has wilfully obtained admission unlawfully, the board of examiners shall decide on the withdrawal of unlawful administrative acts in accordance with the general principles of administrative law.
- (3) The student shall be given the opportunity to comment before a decision is made.

- (4) The inaccurate degree certificate is to be taken away and, if applicable, replaced with a new one.

§ 25

Awarding the master's degree; degree certificate

- (1) ¹Upon the student's request, a diploma and a degree certificate for successful completion of the master's examination are to be issued within four weeks of demonstrating completion of the required module credits. ²The diploma is to include the title of the programme of study. ³It is to be signed by the dean and stamped with the seal of the University. ⁴Upon issuance of the diploma, the graduate is given the right to bear the title "Master of Science". ⁵This title is to be abbreviated "M.Sc." and placed behind the surname.
- (2) ¹The certificate contains the name of the master's programme, the overall examination grade and in the transcript of records all module and partial module examinations are listed with the respective grades and credit points, as well as the topic and grade of the master's thesis. ²The additional credits shall be included on the certificate as long as the student does not submit a request to the contrary. ³The certificate is to be signed by the chair of examiners. ⁴The date to be used is the day of the last examination or the date on which the last graded assignment was submitted. ⁵An English translation of the diploma and a Diploma Supplement shall be issued in addition; the Diploma Supplement shall be signed by the chair of examiners. ⁶In addition to the certificate, an ECTS grading table is to be issued under the terms of § 17 para 4.
- (3) Revoking the degree "Master of Science" is to be carried out in accordance with the legal regulations (Article 101 BayHIG).

§ 26

Academic advising

- (1) General student advising is offered by the University of Bayreuth's Student Advising Office.
- (2) For questions relating to the master's degree programme in Digitalisation & Sustainability in Materials Science & Engineering, i.e. the design of the degree programme, organisation of studies, selection of courses and examination questions, the programme advisor of the master's degree programme in Digitalisation & Sustainability in Materials Science & Engineering will provide advice.
- (3) ¹In the course of the semester, the programme advisor shall offer advising for all students enrolled in the master's programme. ²Advising is recommended especially for the following persons:

1. new students,
2. students who recently failed an examination,
3. students who have considerably less than 30 credit points per semester,
4. students transferring from a different subject, degree programme, or university.

§ 27

Effective date

¹The present regulations go into effect on 26 September 2024. ²They shall be valid for students enrolling in this programme in Summer Semester 2025 or later.

Annex 1: Modules, Credit Points, and Examinations

The following tables list the modules and the corresponding examinations of the master's programme Digitalisation & Sustainability in Materials Science & Engineering.

Abbreviations:

K	Written exam
mP	Oral exam
H	Term paper
P	Presentation
B	Contribution
semA	semester tasks
sA	Written elaboration

- | Vertical lines between examination forms indicate possible alternatives.
- + plus signs define several examinations to be taken.
- x/y fractions indicate the weighting with which the respective examination performance is included in the module grade.
- () Round brackets group related examination components. They can be used to define alternative examination forms for an examination or to divide an examination into several examinations.
 - Examinations marked with "*" are not included in the calculation of the module grade or overall grade.

Module area	Credit points	Examination
Modules		
Compulsory area	27	
Connected Knowledge in Materials Science	7	
CKM Connected Knowledge in Materials Science	7	K
Informatics	10	
PML Python and Machine Learning for Non-Programmers	5	Portfolio examination: sA 3/5 + (semA sA) 2/5
NAS Numerical Methods and Applied Statistics	5	Portfolio assessment: K 2/5 + K 3/5
Sustainability	10	
ERT Environmental and Resource Technology	5	K mP P sA B
CLM Carbon & Life Cycle Management	5	K

Module area Modules	Credit points	Examination
Compulsory elective area Three modules totalling 15 CP must be taken from the Materials Science area. In the areas of Social, Economic and Legal Aspects of Sustainability and Individual Knowledge Development, one module of 6 CP and 5 CP respectively must be taken.	26	
Materials Science	15	
BMB Biomaterials and Biocomponents	5	K
PM Polymer Materials and Technology (DSMSE)	5	Portfolio examination: mP + B*
FSET Functional Materials and Systems Aspects for Energy and Environmental Technology	5	Portfolio assessment: (K mP) + B*
BMM Basics of Metallic Materials	5	Portfolio examination: mP + B*
CMC Ceramic Matrix Composites	5	mP
Social, Economic and Legal Aspects of Sustainability	6	
PoE Principles of Entrepreneurship	6	Portfolio assessment: P 1/2 + sA 1/2
IE Impact Entrepreneurship - Developing Social and Ecological Innovations	6	Portfolio assessment: P 1/2 + H 1/2
IM Innovation Management	6	Portfolio assessment: B 3/5 + sA 2/5
SEC Social Entrepreneurship Cases: Analysing Social Businesses	6	Portfolio assessment: H 3/5 + P 2/5
Individual Knowledge Development	5	
At least one module with at least 5 CP must be taken from the modules of the master's programmes of the Faculty of Engineering Science, the Faculty of Biology, Chemistry and Earth Sciences or the Faculty of Mathematics, Physics and Computer Science.	5	The examination performance depends on the chosen module.

Module area Modules	Credit points	Examination
Focus area At least 5 modules with a total of at least 25 CP must be taken. At least one module must be taken from each of the three specialisation areas.	25	
Sustainable Applications & Processes for Materials		
PS Polymer Systems for Sustainable Applications	5	K
BFM Biomaterials and Biofabrication MOOC	5	K
EM Energy Materials	5	Portfolio assessment: K 2/5 + (K mP) 3/5
BIM Biomimetics	5	Portfolio assessment: K + B*
HE Hydrogen embrittlement: Phenomenon and mechanism	5	Portfolio assessment: mP <4/5> + P <1/5> + B*
BM Battery Materials 1	5	K mP
PIB Polymer Interfaces and Biosensors	5	K
Circular Economy & Sustainable Raw Materials		
CRM Critical raw materials	5	Portfolio assessment: mP 2/5 + P 1/5 + (sA B) 2/5
SPM Sustainable polymer chemistry and polymer materials (DSMSE)	5	Portfolio assessment: (K mP) 1/2 + B 1/2
MS Materials Selection across Materials Classes	5	Portfolio assessment: mP 2/3 + P 1/3
Digitalisation in Materials Science		
MI Materials Informatics	5	Portfolio assessment: (K mP sA) 3/5 + (sA B semA) 2/5
DSP Data Science for Polymers	5	Portfolio assessment: K + B*

Module area Modules	Credit points	Examination
Research module area	12	
RM1 Research Module I	6	Portfolio assessment: sA 3/4 + P 1/4
RM2 Research Module II	6	Portfolio assessment: sA 3/4 + P 1/4
Master's Thesis	30	
MT Master's Thesis	30	Master's thesis 3/4 + P 1/4
Total:	120	

Annex 2: Access to studies, qualifications

A qualified university degree within the meaning of § 2 para 1 number 1 exists if it includes passing examinations that are equivalent to the following examinations of a scientifically oriented relevant bachelor's programme in Materials Science and Engineering Science and there are no significant differences:

- Mathematics area (e.g. mathematics, numerical mathematics, statistics): 12 credit points
- Area of scientific basics (e.g. physics, chemistry, biology): 15 credit points
- Area of materials fundamentals (e.g. materials science, materials engineering) & engineering fundamentals (e.g. mechanics, thermodynamics, process engineering, design engineering) 20 CP

Annex 3: Aptitude assessment process

1. Purpose of aptitude assessment process

¹In accordance with Art. 90 para 1 sentence 2 BayHIG, qualification for the master's programme Digitalisation & Sustainability in Material Science & Engineering requires proof of aptitude in accordance with the following regulations in addition to the requirements set out in § 2 para 1 numbers 1 to 3.

²The special competences of the applicants should correspond to the broad professional fields in the areas of materials science and materials engineering or engineering science. ³Individual aptitude parameters are:

- the ability to work scientifically, or to work according to methods and principles,
- existing specialist knowledge from the relevant first degree programme in Materials Science and Engineering or Engineering Science or related subjects;
- the ability to solve difficult and complex problems,

2. Board responsible for the aptitude assessment process

The board of examiners is responsible for preparing and conducting the aptitude assessment process in accordance with § 5 para 1.

3. Process for determining aptitude

3.1 ¹The aptitude assessment process is administered twice annually, in the summer and winter semesters. ²The application for admission to the aptitude assessment process must be submitted online to the University of Bayreuth. ³The online application for admission is made available on the university's website. ⁴The online application for admission must be received electronically by the University of Bayreuth by 15 June for the following winter semester and by 15 June for the summer semester of each academic year (cut-off deadline). ⁵Documents according to no. 3.2.3 and 3.2.5 can be submitted by 15 July for the winter semester or by 15 February for the summer semester.

3.2 The application must include:

3.2.1 A cover letter in English or German with a maximum 2-page written justification for the choice of master's degree programme in which it is explained on the basis of which competences the applicant considers him/herself particularly suitable for the desired degree programme (see no. 5.1.1.1).

3.2.2 A curriculum vitae as supplementary information.

3.2.3 ¹The certificate of the relevant initial degree (e.g. bachelor's certificate) with Diploma Supplement. ²If the certificate of the relevant first degree is not yet available, a confirmation with individual grades must be submitted for all examinations and coursework completed up to the registration deadline. ³Such credit for examination elements must amount to a total of at least 150 ECTS points. ⁴A list of the modules of the relevant first degree programme for which no certificates of achievement can yet be submitted must be enclosed, stating the expected examination dates.

3.2.4 If available, evidence of relevant special qualifications in accordance with No. 5.1.1.1 (e.g. vocational training, internships, stays abroad, language skills).

3.2.5 If applicable, a request for reasonable accommodations as described in § 15.

4. Admission to the aptitude assessment process

4.1 Admission to the aptitude assessment process requires that the documents listed in number 3.2 be submitted on time.

4.2 The aptitude assessment process (number 5) is to be administered to those applicants who fulfil the requirements.

4.3 Applicants who are not admitted are to be sent a notice of denial; number 6.2 applies *mutatis mutandis*.

5. Overview of the aptitude assessment process

5.1 First stage of the aptitude assessment process:

5.1.1 ¹The committee responsible for conducting the aptitude assessment process uses the submitted application documents to assess whether an applicant is suitable for this master's programme on the basis of their proven qualifications and the specific skills they have demonstrated. ²Two members of the committee examine the submitted documents independently of each other on a scale of 0 to 10 points, with 0 being the worst and 10 the best result to be achieved. ³The evaluation is made by the committee according to the following criteria:

5.1.1.1 ¹The competencies resulting from the documents in accordance with 3.2.1 and 3.2.4 are assessed with a maximum of 5.0 points. ²The assessment criteria are the extent to which the applicant's background to date demonstrates strong prior knowledge and skills in the fields of mathematics, materials science, engineering and natural sciences in the areas of chemistry, physics or biology and the extent to which there is potential for interdisciplinary and international work. ³The content of the cover letter in accordance with no. 3.2.1 together with the evidence in accordance with no. 3.2.4 will be assessed according to the following criteria with the maximum achievable points indicated in brackets:

- linguistic expression and logical structure (max. 1 point);
- scientific quality of the argumentation, references to concrete research problems (max. 2 points);
- justification for the choice of degree programme with a clear description of previous knowledge and skills (max. 2 points).

5.1.1.2 ¹The subject-specific coursework and examinations from the relevant initial degree programme are to be graded on a scale of "0" to "5.0". ²Achievements in the fields of mathematics, materials science, engineering and natural sciences (chemistry, physics or biology) are considered subject-specific. ³Non-subject-specific achievements may be taken into account if it can be expected that the student will be able to achieve the objective of the degree programme on the basis of the competencies demonstrated. ⁴The awarding of points is described in more detail in No. 9.

5.1.2 ¹The candidate's score is calculated by dividing the sum of the individual scores (5.1.1.1 and 5.1.1.2) of the two committee members by two. ²The score is to be rounded to one decimal place behind the comma.

5.1.3 ¹Applicants who have achieved at least seven points will receive confirmation that they have passed the aptitude assessment process. ²Applicants with an overall score of less than five points have failed the aptitude assessment process and will receive a letter of denial; no. 6.2 applies accordingly.

5.2 Second stage of the aptitude assessment process:

5.2.1 ¹The remaining applicants with scores of five to less than seven points will be invited to an interview (second stage of the aptitude assessment process). ²The date for this interview will be announced at least one week in advance. ³Anybody who does not appear on the date set shall be deemed to have been rejected; No. 6.2 shall apply accordingly. ⁴If a reason beyond the applicant's control prevents him or her from participating in the interview, a new appointment is to be scheduled no later than two weeks prior to the start of lectures upon justified request.

5.2.2 ¹The aptitude interview must be conducted individually for each applicant. ²The interview lasts a minimum of 20 and a maximum of 30 minutes and should show whether, on the basis of the applicant's knowledge and skills, it can be expected that he or she will achieve the objective of the degree programme. ⁴Firstly, the applicant's academic and theoretical aptitude with regard to the requirements of the degree programme is assessed in the interview. ⁵The applicant should demonstrate that he or she is able to work on academic issues as part of his or her master's programme (50% of the assessment). ⁵Secondly, the applicant's previous knowledge and skills in the area of the master's degree programme are checked. ⁶The applicant should demonstrate that he or she has dealt with current research issues in materials engineering or engineering science

or natural science in the fields of chemistry or physics or biology (50% of the assessment). ⁷In particular, students must be able to recognise and derive cross-material class structure-property relationships, as well as relationships between physical and chemical mechanisms, and kinetic and thermodynamic principles.

5.2.3 ¹The aptitude interview is conducted by two members of the committee. ⁵Each member is to assign a grade for the interview on a scale of 1 to 5. ³At least 50% of the previous coursework and examinations in accordance with no. 5.1.1.2 are taken into account when determining the grade. ⁴The arithmetic mean of the individual grades is to be calculated and rounded to one decimal place. ⁵Applicants who received at least a grade of good (2.5) are classified as "suitable" and shall be sent confirmation of having passed the aptitude assessment process. ⁶The remaining applicants who are not admitted are to be sent a notice of denial; number 6.2 applies *mutatis mutandis*.

5.2.4 ¹ A written record shall be made of the interview, indicating the date, duration, location, name of committee members involved, the names of the applicants, the topics discussed, the assessment of the board members, and the overall outcome as well as any essential reasons for the assessment. ² The essential reasons and topics may be listed in note form. ³The record sheet is to be signed by the committee members who were present.

6. Determining and announcing results

6.1 The course of the aptitude assessment process must be documented; in particular, the decisions of the committee in accordance with the present regulations and the overall outcome must be evident.

6.2 ¹Applicants will be informed of the result of the aptitude assessment process in writing. ²Notices of denial containing a rationale and information concerning the right to appeal are to be signed by the chair of the committee.

6.3 Admissions within the framework of the aptitude assessment procedure for the master's programme in Digitalization & Sustainability in Materials Sciences & Engineering apply to all subsequent applications for this degree programme, provided that the content and objective of the degree programme have not changed so significantly that the aptitude for this degree programme can no longer be proven on the basis of the aptitude assessment process carried out at an earlier point in time.

7. Repeating the process

Applicants who have not provided proof of aptitude for the master's programme in Digitalization & Sustainability in Materials Sciences & Engineering can re-register once for the aptitude assessment process.

8. Aptitude assessment process for higher semesters

For applicants who wish to enter advanced semesters (university transfer, career changers), nos. 3 to 7 apply accordingly.

9. Assessment key

The subject-specific study and examination achievements of the relevant first degree in the field of mathematics, materials science and engineering and natural science (chemistry or physics or biology) (No. 5.1.1.2) are included in the assessment according to the following table:

POINTS	ASSESSMENT
5,0 – 4,6	excellent
4,5 – 3,5	considerably above average
3,4 – 2,4	above average
2,3 – 1,3	average
1,2 – 0,6	sufficient despite deficiencies

Issued on the basis of a decision of the Senate of the University of Bayreuth dated 15 May 2024 and the approval of the President of the University of Bayreuth dated 16 September 2024, Ref. No. A 3396/22 - I/1.

Bayreuth, 25 September 2024 UNIVERSITY OF BAYREUTH
[seal]

THE PRESIDENT
[signature]
Professor Dr. Stefan Leible

These regulations were enacted at the university on 25 September 2024.

This was announced on 25 September 2024 by posting a notice at the university.

The date of the announcement is 25 September 2024.