

Specific Examination Regulations for the consecutive Master's degree program Computational Modeling and Simulation

as of February 18, 2026

Pursuant to § 14 para. 4 sentence 1 in conjunction with § 2 para. 2 and § 35 para. 1 sentence 1 of the Saxon Higher Education Act of May 31, 2023 (SächsGVBl. p.329), last amended by Article 2 of the Act of January 31, 2024 (SächsGVBl. p. 83), the Faculty Board of the Faculty of Computer Science, the Faculty Board of the Faculty of Mathematics and the Scientific Council of the Center for Molecular and Cellular Bioengineering, after consulting with the Study Commission for the Master's degree program in Computational Modeling and Simulation, issued the following Specific Examination Regulations, which have been approved by the University Executive Board:

Table of contents

- § 1 Scope of application
- § 2 Language of instruction, duration, and scope of studies
- § 3 Subject-specific admission requirements for the Master's examination
- § 4 Bonus achievements
- § 5 Subject, nature and scope of the Master's examination
- § 6 Allotted time, form and copies of the Master's thesis; colloquium
- § 7 Weighting for the final and overall grades
- § 8 Additional information
- § 9 Master's degree
- § 10 Transitional provisions
- § 11 Entry into force

Annex 1 (concerning § 5, para. 3, nos 1–3) Modules for basic language training, basic subject-specific training, and basic scientific and methodological training

Annex 2 (concerning § 5 para. 3 no 4) Track Modules

§ 1

Scope of application

These specific Examination Regulations apply in conjunction with the General Examination Regulations. Together, they comprise the Examination Regulations for the consecutive Master's degree program in Computational Modeling and Simulation pursuant to § 1 para. 2 sentence 2 of the General Examination Regulations, as defined in § 35 of the Saxon Higher Education Act. These Examination Regulations apply in conjunction with the Study Regulations for the consecutive Master's degree program in Computational Modeling and Simulation.

§ 2

Language of instruction, duration, and scope of studies

(1) The Master's degree program in Computational Modeling and Simulation is taught in English.

(2) The standard period of study is 4 semesters.

(3) By passing the Master's examination, a total of 120 credits are awarded for modules, the Master's thesis, and the colloquium.

§ 3

Subject-specific admission requirements for the Master's examination

Prior to the topic of the Master's thesis being issued, students must have earned at least 72 credits.

§ 4

Bonus achievements

Students may voluntarily earn bonus credits for specific examined assessments by completing certain study achievements (bonus achievements). If the examined assessment was assessed with at least "pass" (4.0), bonus credits can replace a maximum of 10 percent of the total number of credits of the associated examined assessment in addition to the assessment credits acquired by the student. The type and form of the bonus achievements as well as their assignment to an examined assessment must be regulated in the module descriptions. The number of bonus credits that can be earned through bonus achievements, as well as the total number of credits that can be earned in the associated examined assessment, will be announced in the usual manner at the beginning of each semester. Earned bonus credits will only be counted towards the next examination date that follows the bonus achievement and that is binding for the student.

§ 5

Subject, nature and scope of the Master's examination

(1) The Master's examination comprises all module examinations of the modules of the compulsory field and the module examinations of the selected modules of the elective compulsory field.

(2) The Compulsory Field comprises the modules

1. Soft Skills and
2. Research Assignment.

(3) The elective compulsory field comprises

1. the modules for basic language training, of which 1 module worth 5 credit points must be selected in accordance with Annex 1 of these Specific Examination Regulations,
2. The modules for fundamental subject-specific training, of which three modules worth 15 credit points must be selected in accordance with Annex 1 of these Specific Examination Regulations,
3. The modules for fundamental scientific and methodological training, of which 1 module worth 3 credit points must be selected in accordance with Annex 1 of these Specific Examination Regulations as well as
4. The following tracks:
 - a) Track Applied Artificial Intelligence,
 - b) Track Computational Engineering,
 - c) Track Computational Environmental Science and Engineering,
 - d) Track Computational Life Science,
 - e) Track Computational Mathematics,
 - f) Track Computational Modeling in Energy Economics and
 - g) Track Visual Computing,

Of which 1 track as well as the modules worth 50 credit points must be selected in accordance with Annex 2 of these Specific Examination Regulations.

§ 6

Allotted time, form and copies of the Master's thesis; colloquium

(1) The Master's thesis requires 870 hours of work and is worth 29 credit points. The allotted time to complete the thesis shall be 22 weeks. In individual cases, the Examination Committee may, upon justified request by the student, extend the allotted time by a maximum of 11 weeks.

(2) The Master's thesis must be submitted as a digital text file in PDF/A format or in an accessible PDF/UA format. The Master's thesis must be submitted electronically. This requires that the student use their personal ZIH email account provided to them upon enrollment. The specific organizational details will be communicated to the student in the usual manner prior to the distribution date. Only those digital technologies may be used that correspond to the generally recognized state of the art at the time of use. If technical problems arise during the submission of the Master's thesis that are attributable to the Examination Office and result in the student missing the deadline, the student is required to report the technical problem immediately. If reported immediately, the Examination Committee will decide on a case-by-case basis whether the technical malfunction during the submission of the Master's thesis was significant and may, to compensate for the technical malfunction, set a later submission deadline in favor of the student. Upon a student's substantiated request, the Examination Committee may decide, on a case-by-case basis, that the Master's thesis may be submitted in two printed copies if the student can demonstrate that they are unable to provide the necessary equipment for electronic submission.

(3) The Master's examination shall include a colloquium. The colloquium shall run for 60 minutes. 1 credit point shall be awarded.

§ 7

Weighting for the final and overall grades

(1) When calculating the final grade, the grade for the Master's thesis shall be weighted three-fold and the grade for the colloquium shall be weighted once.

(2) When calculating the overall grade, the final grade for the Master's thesis shall be weighted 60-fold.

§ 8

Additional information

The examination certificate will also include the selected track and, at the student's request, the grades for additional modules and the corresponding credit points. The supplement to the transcript will also list the names of the examiners for each individual course and, at the student's request, the grades for courses in additional modules.

§ 9

Master's degree

Once the master's examination has been passed, the Master of Science (M.Sc.) degree shall be awarded.

§ 10

Transitional provisions

(1) These Specific Examination Regulations will apply for the first time to students newly enrolled in the Master's degree program in Computational Modeling and Simulation in the 2026/2027 winter semester.

(2) For students who enrolled in the Master's degree program in Computational Modeling and Simulation prior to the 2026/2027 winter semester, the version of the Examination Regulations for the consecutive Master's degree program in Computational Modeling and Simulation dated April 20, 2018 (Official Announcements of TU Dresden No. 9/2018 of May 5, 2018, p. 66), last amended by the Statutes of February 18, 2026 (Official Announcements of TU Dresden No. 2/2026 of March 24, 2026 p. 785), shall continue to apply until September 30, 2027. Thereafter, these specific examination regulations shall also apply to students in accordance with sentence 1. In addition, for non-identical modules, including grades, the module examinations already taken will be transferred ex officio as a priority, and individual examination performances will also be transferred on the basis of equivalence tables, which are determined by the Examination Committee and announced in the usual manner. With the exception of § 21 para. 5 of the General Examination Regulations, module examinations and examination performances that have not been graded with at least "sufficient" (4.0) or "pass" shall not be transferred. The module grade is generally not recalculated based on exclusively transferred examined assessments. Exceptions are listed in the equivalence tables. For identical modules, all credits shall be carried over ex officio.

(3) Notwithstanding para. 2, sentence 2, students referred to in para. 2, sentence 1, who have passed all module examinations covered by the Master's examination up to and including 30 September 2027, may continue to apply the version of the Examination Regulations applicable to

them up to that point, as referred to in para. 2, sentence 1, even after 30 September 2027, up to and including 30 September 2028.

§ 11
Entry into force

These Specific Examination Regulations shall enter into force on April 1, 2026.

The above statutes hereby formally take effect. They shall be published in the Official Announcements of TU Dresden.

Dresden, as of February 18, 2026

The Rector
of TUD Dresden University of Technology

Prof. Ursula M. Staudinger

Annex 1 (concerning § 5, para. 3, nos 1–3) Modules for basic language training, fundamental subject-specific training, and fundamental scientific and methodological training

A. Modules for basic language training are:

1. Foreign Language A1 Advanced Level - Arabic,
2. Foreign Language A1 Advanced Level - Chinese,
3. Foreign Language A1 Advanced Level - German as a Foreign Language,
4. Foreign Language A1 Advanced Level - Finnish,
5. Foreign Language A1 Advanced Level - French,
6. Foreign Language A1 Advanced Level - Italian,
7. Foreign Language A1 Advanced Level - Japanese,
8. Foreign Language A1 Advanced Level - Polish,
9. Foreign Language A1 Advanced Level - Portuguese,
10. Foreign Language A1 Advanced Level - Russian,
11. Foreign Language A1 Advanced Level - Swedish,
12. Foreign Language A1 Advanced Level - Spanish,
13. Foreign Language A1 Advanced Level - Czech,
14. Foreign Language A2 - Arabic,
15. Foreign Language A2 - Chinese,
16. Foreign Language A2 - German as a Foreign Language,
17. Foreign Language A2 - Finnish,
18. Foreign Language A2 - Japanese,
19. Foreign Language A2 - Polish,
20. Foreign Language A2 - Russian,
21. Foreign Language A2 - Czech,
22. Foreign Language A2 Advanced Level - Arabic,
23. Foreign Language A2 Advanced Level - German as a Foreign Language,
24. Foreign Language A2 Advanced Level - French,
25. Foreign Language A2 Advanced Level - Italian,
26. Foreign Language A2 Advanced Level - Polish,
27. Foreign Language A2 Advanced Level - Portuguese,
28. Foreign Language A2 Advanced Level - Russian,
29. Foreign Language A2 Advanced Level - Swedish,
30. Foreign Language A2 Advanced Level - Spanish,
31. Foreign Language A2 Advanced Level - Czech,
32. Foreign Language A2 Advanced Level - Chinese,
33. Foreign Language A2 Advanced Level - Japanese,
34. Foreign Language B1 - Arabic,
35. Foreign Language B1 - German as a Foreign Language,
36. Foreign Language B1 - French,
37. Foreign Language B1 - Italian,
38. Foreign Language B1 - Portuguese,
39. Foreign Language B1 - Russian,
40. Foreign Language B1 - Spanish,
41. Foreign Language B1 - Chinese,
42. Foreign Language B1 - Japanese,
43. Foreign Language B1 Advanced Level - Arabic,
44. Foreign Language B1 Advanced Level - German as a Foreign Language,
45. Foreign Language B1 Advanced Level - French,
46. Foreign Language B1 Advanced Level - Italian,
47. Foreign Language B1 Advanced Level - Russian,
48. Foreign Language B1 Advanced Level - Swedish,

49. Foreign Language B1 Advanced Level - Spanish,
50. Foreign Language B1 Advanced Level - Portuguese,
51. Foreign Language B1 Advanced Level - Chinese,
52. Foreign Language B1 Advanced Level - Japanese,
53. Foreign Language B2 - German as a Foreign Language,
54. Foreign Language B2 - French,
55. Foreign Language B2 - Italian,
56. Foreign Language B2 - Portuguese,
57. Foreign Language B2 - Russian,
58. Foreign Language B2 - Spanish,
59. Foreign Language B2 - Swedish,
60. Academic Competencies - B2 Advanced Level - German as a Foreign Language,
61. Academic Competencies - B2 Advanced Level - French,
62. Academic Competencies - B2 Advanced Level - Russian,
63. Academic Competencies - B2 Advanced Level - Spanish,
64. Professional Language Competencies - B2 Advanced Level - German as a Foreign Language,
65. Professional Language Competencies - B2 Advanced Level - French,
66. Professional Language Competencies - B2 Advanced Level - Russian,
67. Professional Language Competencies - B2 Advanced Level - Spanish,
68. Academic Competencies C1 - German as a Foreign Language,
69. Academic Competencies C1 - French,
70. Academic Competencies C1 - Russian,
71. Academic Competencies C1 - Spanish,
72. Professional Language Competencies C1 - German as a Foreign Language,
73. Professional Language Competencies C1 - French and
74. Professional Language Competencies C1 - Spanish.

Of these, one module must be chosen.

B. The fundamental subject-specific training modules are:

1. High-Performance Computing,
2. Machine Learning,
3. Basic Numerical Methods,
4. Stochastics and Probability,
5. Scientific Software Engineering and
6. Data Visualization.

Of these, three modules must be chosen.

C. The fundamental scientific and methodological modules are:

1. Literature Studies in Deep Learning for Applied Image Analysis,
2. Literature Studies in Computational Engineering,
3. Literature Studies in Computer Graphics and Visualization,
4. Literature Studies in Combinatorial Image Analysis,
5. Literature Studies in Computational Life Science,
6. Literature Studies in Computational Metrology,
7. Literature Studies in Computing,
8. Literature Studies in Computer Vision,
9. Literature Studies in Knowledge Graph Representation Learning,
10. Literature Studies in Knowledge Representation and Reasoning,
11. Literature Studies in Mathematical Biology,
12. Literature Studies in Machine Learning and
13. Literature Studies on Software Methods and Technologies for Virtual Aircraft.

Of these, one module must be chosen.

Annex 2 (concerning § 5 para 3 no 4) Track Modules

Select 1 of the 7 tracks.

A. Track Applied Artificial Intelligence

- I. The compulsory module is Digital Circuit Design.
- II. The elective compulsory modules are:
 1. Computer Vision,
 2. Machine Learning in Signal Processing,
 3. Advanced Problem Solving and Search,
 4. Conversational Artificial Intelligence,
 5. Foundations of Computer Graphics,
 6. Digitization and Data Analytics,
 7. Adaptive Laser systems,
 8. Circuit- and System Design,
 9. Deep Neural Network Hardware,
 10. Virtual Reality,
 11. Hardware - Software Codesign,
 12. Applied Robotics and Control for Cooperative and Autonomous Mobility,
 13. Robot Learning,
 14. Scientific Visualization,
 15. Computer- and Robot-Assisted Surgery,
 16. Sound Design,
 17. Computational Laser Systems,
 18. Touch Sensing and Processing,
 19. Team Assignment Computational Metrology,
 20. Deep Learning for Vision - Foundations and Applications.
 21. Team Assignment Machine Learning and Computer Vision and
 22. Team Assignment AI Hardware.

Of these modules, the following must be selected:

1. Modules with a total of 35 credit points according to numbers 1 to 20 and
2. 1 module as specified in numbers 21 and 22.

B. Track Computational Engineering

- I. The compulsory modules are:
 1. Computational Fluid Dynamics,
 2. Finite element methods - Theory, implementation and applications,
 3. Advanced Topics in Finite Element Analysis,
 4. Multi Body Dynamics and
 5. Multifield Problems.
- II. The elective compulsory modules are:
 1. User Interface Engineering,
 2. System Dynamics,
 3. Foundations of Systems Engineering,
 4. Advanced Problem Solving and Search,
 5. Scientific programming – Advanced concepts,
 6. Foundations of Computer Graphics,
 7. Closed-Loop Control in Networked Control Systems,
 8. Electromechanical and microelectromechanical systems,
 9. Advanced User Interfaces,
 10. Digitization and Data Analytics,
 11. Interactive Information Visualization,
 12. Particle Methods,

13. Scientific Visualization,
14. Introduction to Computational Aerodynamics,
15. Practical Aspects of Simulation,
16. Touch Sensing and Processing,
17. Computer- and Robot-Assisted Surgery and
18. Computer Vision.

Of these, five modules must be chosen.

C. Track Computational Environmental Science and Engineering

I. The compulsory modules are:

1. Computational Environmental Science Team project and
2. Computational Environmental Applications.

II. The elective compulsory modules are:

1. Computational Statistics,
2. Geodata Infrastructures,
3. Statistical Learning for Earth System Sciences,
4. Image Analysis and Machine Learning in Environmental Remote Sensing,
5. Retrieval of Land Surface Properties from Optical and Microwave Remote Sensing,
6. Applied Remote Sensing for Environmental Research
7. Computer Vision,
8. Hydrological Modeling,
9. Individual-based Ecology and Modeling,
10. Hydrological Modeling Practice,
11. Numerical Methods in Hydrosiences,
12. Advanced Model Evaluation,
13. Environmental and Climate Remote Sensing,
14. Climatology and Hydrology,
15. Climate Change,
16. Feedbacks between Land Surfaces and the Atmosphere,
17. Geodetic Space Techniques for Climate Research,
18. Laser Scanning and 3D Point Cloud Processing and
19. Recent Methods of Photogrammetric Geodata Acquisition.

Of these modules, the following must be selected:

1. 2 modules as specified in numbers 1 to 7,
2. 2 modules as specified in numbers 8 to 12 and
3. Modules with a total of 15 credit points according to numbers 13 to 19.

D. Track Computational Life Science

I. The compulsory modules are:

1. Applied Bioinformatics,
2. Modeling and Simulation in Biology and
3. Computational Life Science Team project.

II. The elective compulsory modules are:

1. User Interface Engineering,
2. Computational Fluid Dynamics,
3. Foundations of Computer Graphics,
4. Digitization and Data Analytics,
5. Particle Methods,
6. Advanced Biological Physics,
7. Scientific Visualization,
8. Advanced User Interfaces,
9. Interactive Information Visualization,

10. Multifield Problems,
11. Interactive Multimedia Information Retrieval,
12. Advanced Topics in Finite Element Analysis,
13. Multi Body Dynamics,
14. Virtual Reality,
15. Robot Learning,
16. Geometric Modeling and Animation,
17. Computer- and Robot-Assisted Surgery,
18. Active Matter Hydrodynamics,
19. Computer Vision,
20. Introduction to Computational Aerodynamics,
21. Advanced Problem Solving and Search,
22. Foundations of Virtual Reality,
23. Physics Based Graphics and
24. Deep Learning for Vision - Foundations and Applications.

Of these, six modules must be chosen.

E. Track Computational Mathematics

I. The compulsory modules are:

1. Finite Element Methods - Theory, Implementation and Applications,
2. Numerical Methods for Partial Differential Equations - Basic Concepts,
3. Modeling Case Studies,
4. Scientific Computing - Advanced Concepts,
5. Scientific Programming - Advanced Concepts and
6. Computational Mathematics Research Work.

II. The elective compulsory modules are:

1. Active Matter Hydrodynamics,
2. Computational Fluid Dynamics,
3. Introduction to Mathematical Biology I: Discrete Models,
4. Numerical Methods for Partial Differential Equations - Advanced Concepts,
5. Mathematical Methods in Continuum Mechanics,
6. Advanced Biological Physics,
7. Introduction to Mathematical Biology II: Continuum Models and
8. Computer Vision.

Of these, three modules must be chosen.

F. Track Computational Modeling in Energy Economics

I. The compulsory modules are:

1. Applied Power System Economics,
2. Electric Power Markets,
3. Case Studies in Energy Economics and
4. Resource Economics and Environmental Policy.

II. The elective compulsory modules are:

1. Numerical Methods for Partial Differential Equations - Basic Concepts,
2. Finite Element Methods - Theory, Implementation and Applications,
3. Literature Studies in Energy Economics,
4. Numerical Methods for Partial Differential Equations - Advanced Concepts,
5. Scientific Computing - Advanced Concepts,
6. Optimization in Modern Electricity Markets,
7. Advanced Problem Solving and Search and
8. Scientific Programming - Advanced Concepts.

Of these, four modules must be chosen.

G. Track Visual Computing

I. The compulsory module is Visual Computing Team project.

II. The elective compulsory modules are:

1. Computer Vision,
2. Foundations of Computer Graphics,
3. User Interface Engineering,
4. Conversational Artificial Intelligence,
5. Geometric Modeling and Animation,
6. Scientific Visualization,
7. Advanced User Interfaces,
8. Interactive Information Visualization,
9. Digitization and Data Analytics,
10. Interactive Multimedia Information Retrieval,
11. Touch Sensing and Processing,
12. Physics Based Graphics,
13. Foundations of Virtual Reality,
14. Computer- and Robot-Assisted Surgery and
15. Deep Learning for Vision - Foundations and Applications.

Of these, eight modules must be chosen.