Checklist for applicants to the programme “MSc Nanoscience” at the University of Kassel

This checklist is designed to help you in predicting whether you are eligible for the MSc Nanoscience programme. You may add this list to your application portfolio, but we need to check all prerequisites independently. The final decision is made by the examination committee after you have applied formally (for international applications via uni-assist.de). Please understand that we cannot guarantee any decision in advance.

Please note that you should have advanced knowledge in two natural sciences (Physics, Chemistry, Biology) and at least basic knowledge in the third one on tertiary education level. If you studied Physics, Chemistry, or Biology, you should have taken at least some courses in the other subjects. If you have a Bachelor degree in Nanoscience, General Science, Pharmacy, Biochemistry, or other interdisciplinary subjects, you probably fulfill the requirements easier. If you hold an engineering degree, normally it is more difficult for you to fulfill the requirements. For example, if you have a degree in Electrical Engineering without two natural sciences, you will be not eligible for the programme. In this case, we refer to other study programmes offered at the University of Kassel.

A. Scientific requirements

Here is a topical list of subjects we expect you to know about from your previous bachelor’s degree. For your orientation, the minimum number of credits are given in the last column. If you count the numbers of missing prerequisites and obtain a sum of more than 30 credits, we advise you not to apply in order to save time and money. If you do not fulfill all listed requirements, the Examination Committee may still grant admission on the condition that you catch up on missing subjects with up to 30 credits. Please note that the missing courses from the bachelor’s degree in Nanoscience at Kassel University are only offered in German language.

I have **basic knowledge** in three natural sciences

Chemistry:
- General Chemistry (PSE, chemical bond, acids and bases, redox reactions)  □  8 C
- Inorganic Chemistry (chemistry of the most important elements)  □  10 C
- Organic Chemistry (alkanes, alkenes, carbonyl compounds)  □  10 C
- Physical Chemistry (thermodynamics, reaction kinetics, electrochemistry)  □  5 C

Physics:
- Mechanics and Heat (Newton’s laws, kinematics, conservation laws, oscillations, liquid bodies, thermal conduction)  □  7 C
- Electricity and Optics (electrostatics, electrodynamics, electromagnetic waves, refraction, interference)  □  7 C
- Quantum mechanics (wavefunctions, Schrödinger equation, particle in a box, rotator, oscillator, H atom)  □  5 C

Biology:
- Genetics and biochemistry (nucleic acids, replication, transcription, translation, proteins, carbohydrates, lipids, enzyme reactions, energy requirements)  □  8 C

In addition, I have **advanced knowledge** and **practical skills** in at least two of three disciplines

Chemistry:
- Synthetic chemistry (metal-catalyzed reactions, C-C- and C-heteroatom bond formation, practical performance of chemical syntheses)  □  12 C
Physics:
Solid state physics  □  6 C
Atomic and molecular physics  □  6 C
Physical Laboratory (practical performance of experiments, data evaluation with treatment of uncertainties, linear regression)  □  10 C

Biology:
Additional biological disciplines: e.g. cell biology, microbiology, (neuro)physiology, with practical experience in the most important molecular biological methods  □  12 C

B. Language requirements
We require English level B2 which can be obtained in one of the following ways:
a) 5 years of English at school until the final exam which allows entry into university (the final exam or the English courses of the last two years have to be passed)  □
or b) One year of studies at higher education (e.g. university) in which the primary language was English  □
or c) One of the following certificates:
TOEFL certificate, Internet-based with Total 72-94 or more  □
TOEIC certificate, 400-485 (listening), 385-400 (reading) or more  □
Telc English certificate B2 or B2 School, Business, Technics  □
ESOL First Certificate in English (Cambridge University)  □
Certificate in English Language Skills (CELS) Vantage  □
College English Test (CET) certificate Band -6 or more  □

German is not necessary for the modules in the Master curriculum, however for daily life and modules of the Bachelor curriculum (if required), it is useful to have a basic command of the language.