

Organization of Exercises: R Mathematical methods, WiSe2025/26 (last changed: 20.09.25)

Prof. Jan von Delft (Theresienstrasse 37, room 420, Tel: 2180-4527, vondelft@lmu.de)

Website: <https://moodle.lmu.de> → Search course: [R25 Rechenmethoden](#)

Important dates (including exam dates): siehe Moodle → [Termine](#)

Importance of the exercises: The mathematical methods (Rechenmethoden) taught in this course are essential to physics; you should be fully proficient and fluent in them. This requires practice, practice, practice! Take the exercises seriously - they are the most important part of the R course! **Those who are unable to solve the exercises independently (and without aids such as ChatGPT!) are guaranteed to fail the exams.** The exams predominantly consist of „typical exercise problems“ (in modified form). In particular, practice **reliability** (avoiding careless mistakes) and **speed** when doing calculations – e.g. by solving several similar problems until you attain fluency.

Exercise supervisor: Markus Frankenbach, M.Frankenbach@campus.lmu.de, Theresienstr. 37, Raum 417, Tel: 2180-4530.

Exercise sign-up: compulsory, online, for detailed instructions click [here](#). There you can state your preferred tutorial time slots; you will then be assigned to a particular exercise group (Übungsgruppe) via a lottery scheme. Sign-up begins Mo. 22.09.25 and ends **Mo, 06.10.25**, 23:59. Late sign-up (for latecomers): We. 08.10.25, 18:00 – **We. 15.10.25**, 23:59

One tutorial is only for **women (Frauentutorium)** and two for **Lehramt/Nebenfach** – see instructions for [exercise sign-up](#).

English exercises: Every physicist eventually needs to read specialized physics literature in English, at the latest for the bachelor thesis during the 6th semester. The sooner you start doing physics in English, the better! Therefore, some tutorials are offered in English (groups 1,6,7,10,14). If you prefer attending German tutorials, please make your selection accordingly. Conversely, those who prefer English tutorials should give these high priority when indicating your preferences. The English tutorials are based on English translations of the German exercise sheets; you can submit your solutions in either German or English. Some students (including German-speaking ones) find the English problem sets to be formulated more clearly than the German ones!

Assignment of exercises groups: The preliminary (or final) assignment of LSF-registered students into exercise groups with corresponding time slots will be announced on Tue. 07.10.25, 18:00 (or Th. 16.10.25, 18:00) on the lecture homepage. Changes are possible only under exceptional circumstances. To request a change, email M.Frankenbach@campus.lmu.de (with a detailed justification), according to the instructions for the [exercise sign-up](#) on the course website.

Guest visits to other tutorials: Your final exercise group assignment (after requests for changes have been considered) also determines your tutor. However, you are welcome to attend other tutorials (in addition to or instead of your own).

Unofficial participation in exercise classes without registration is possible for students with no intention of receiving an exercise grade (e.g. retirees or high school students); they will not be assigned to any exercise group and may choose one on their own.

Study groups: We warmly recommend joining one or several self-organized study groups to jointly discuss/solve the exercise sheets. This will enormously enhance your motivation and understanding of the material.

Weekly exercise times:

Monday afternoon	Thursday	Mo, Tue	Thursday afternoon	Monday, Tuesday
Current exercise sheet and EP solutions go online. Self-study starts.	Central exercise.	Tutorials	Submission of previous homework sheet. Its HP solutions go online.	Return of previous homework sheet.

1. Publication of the „current exercise sheet“ is done via Moodle, late Monday afternoon. It deals with the material covered in the lectures of the current week (Mo, Wed). It contains *example problems* (EPs) serving as templates for solving the homework problems, *homework problems* (HPs) to be solved independently and submitted, and *optional problems* (OPs) for enthusiasts. Abbreviations indicate the degree of difficulty: E = easy, M = medium, A = advanced.

2. Master solutions for the EPs are published simultaneously with the current exercise sheet.

3. Self-study of the current sheet should start as soon as possible, most certainly before the exercise class dealing with that sheet one week later. Study the EPs and their solutions. Figure out how the EPs and HP are related. Start working on the HPs. Identify which issues are unclear to you, to be able to ask informed questions in the tutorial.

4. Central Exercise (Zentralübung): Th. 14-16 (three days after publication). It is used (i) by Markus Frankenbach M.Frankenbach@campus.lmu.de for **presenting the solutions** of several EP on the current exercise sheet; (ii) as time slot for the practice exam, Th. 15.01.26, 14:15 – 16:00 [its grade contributes to the exercise bonus].

5. Tutorial: (Mo. & Tu., One week after publication of the current sheet.) The Tutor:

- discusses common mistakes found on the HP solutions which were graded and returned just before;
- answers questions regarding the lecture and the EP (self-studied or presented in the central exercise);
- explains how EPs and new HPs are related (they are very similar, having understood EP, HP becomes manageable!);
- helps his/her students, ideally via joint discussions (possibly in small groups of 2-4 people) to get started on solving the HPs – this is the perhaps most important part of the tutorial.

Goal: By the end of the tutorial, you will have clear ideas for how to complete the HPs.

6. Homework: Complete, handwritten solutions (on paper or tablet) to the HPs are to be produced at home and submitted on time (see 7.). HPs may be solved together in groups. Solutions may be submitted by single persons or teams-of-two. For teams-of-two it is desirable for about half of the problems to be solved in one handwriting, the others in another handwriting, since writing down and understanding the solutions oneself is very important! Irrespective of that, both partners receive the same grade. Teams-of-two can be chosen differently for each solution sheet. You may use either German or English for your solutions, regardless of whether you are in a German or English group – in any case the solutions mostly consist of formulas, not text.

7. Submission of homework solutions: 10 days after the publication date, by Thursday afternoon, 14:00, via file-upload on Moodle. After this time, no upload is possible. Solution sheets should be written in fair copy (in Reinschrift) – if you submit a messy solution looking like a scribble/rough draft, you risk a point deduction of up to 100%. Solution sheets should be brought into sorted order, scanned/photographed with good lighting, and uploaded as a single .pdf file. The first page should clearly contain your name and exercise group number (1,2,...) in printed letters at the top, right corner. For teams-of-two, only one partner should upload a solution, but it must contain the names of both partners. The only file format accepted by the Moodle submission form is .pdf (this facilitates the tutors' task of grading the solutions electronically). Plan in a troubleshooting time reserve of at least one hour for doing the upload – even though uploading typically proceeds smoothly, all sorts of unexpected technical problems do arise ever so often. If the upload nevertheless fails to succeed by 14:00, the solution should be emailed to M.Frankenbach@campus.lmu.de immediately thereafter, and no more than 5 minutes after the submission deadline.

8. Master solutions for the HPs will be published late Thursday afternoon.

9. Return of graded homework solutions: occurs via Moodle, ideally before the start of the next tutorial, but at the latest before the next submission deadline. The correction load is shared equally among all tutors each week, so the tutor grading your sheets may change from sheet to sheet; However, his/her name will always be noted on the sheet to enable email queries ([email list of all tutors](#)). If your sheet is not returned on time, please first write to the tutor who corrected the previous sheet, and if that does not help, to M.Frankenbach@campus.lmu.de.

Copying and pasting (plagiarism): Copying HP solutions is unacceptable (regardless from which source). If you copy, you first and foremost cheat yourself. The exam is challenging. Without regular practice in solving difficult problems on your own, you will struggle mightily in the exam. When caught copying for the first time, you will receive a warning and lose 50% of all points achieved for that problem set. For all subsequent cases of copying, you will get 0 points for the entire problem set. Each case of suspected copying will be scanned and reported to the lecturer. – Submitted solutions based on honest, independent work are usually preceded by rough drafts. Keep and file such drafts at home until the end of the semester, to be able to refute unfounded allegations of copying.

Minor subject & teacher trainees (Nebenfach & Lehramt, N & L, 6 ECTS credits): You are examined only on the material of lectures 1-20 and exercise sheets 1-10. (You can improve your grade by answering exam questions on the remaining material.)

Registration and admission to the exam: Exam registration starts some weeks before the exam date via [LSF](#). Admission to the main exam is open to anyone. Admission to the retake exam (Nachklausur) is open only to those that have not passed the main exam. Those that have passed the main exam thus cannot use the retake exam to improve their grades.

Exam modalities: Absolutely no aids are permitted, also not self-written notes (Spickzettel), see Moodle → Klausur → [Exam instructions](#).

Criteria for passing and earning a certificate (Schein): Final grade (Endnote) $E \geq 50\%$.

Computation of final grade: The final grade $\underline{E}$ (in %) is computed as $E = K + 0.15\bar{U}$. Here, K is the score (in %) for the main exam (Hauptklausur), or, if it has not been passed, the retake exam (Nachklausur); $\bar{U}$ is the exercise bonus (Übungsbonus) (in %).

Exercise Bonus (Übungsbonus): $\bar{U}$ (in %) = $100 \sum_i (P_i + B_i) / \sum_i P_i$ is the percentage of total points obtained by solving homework sheets and participating in the practice exam, which counts as an extra sheet. Here, the i -sums run over sheets 01-14 (N & L: of sheets 01-10) and the practice exam. For each sheet i , P_i and B_i are the total number of points and bonus points obtained for that sheet, respectively. (The largest achievable value of P_i is shown in the last line of sheet i , and that of $P_i + B_i$ in the point spread column of the Moodle grading-results table.) $\bar{U}$ enables you to improve your final grade by up to 15%. If you do not submit homework solutions or do not participate in the practice exam, you are thus giving away points for $\bar{U}$. Aim to maximize your $\bar{U}$, since the exams are challenging!! Based on past experience, among those exam participants with $\bar{U} < 40\%$, less than 25% manage to earn a certificate.

Attendance is compulsory: for students taking the R course for the first time. This does not apply to returnees (Wiederholer), high school students (Frühstudenten) and retirees (Senioren). The minimum requirement for earning an exercise bonus is participation in at least 10 out of 14 (N & L: 6 out of 10) tutorials in separate weeks starting from the second week of classes (the get-to-know tutorial of the first week does not count), as documented via your presence on attendance lists, else $\bar{U}=0$ is used. Attendance of lectures and central exercises is voluntary.

Attendance list: In each tutorial session, an attendance list will be set up. If you attend several tutorials per week (you're welcome to do so!), your presence will be documented on several lists; however, only one participation per week is counted when checking whether the minimum required for attendance has been fulfilled.

Returnees (Wiederholer): are exempted from compulsory attendance and can decide freely whether they wish to participate in the tutorials. The exercise grades which they obtained in the preceding year will be transferred and counted for the current semester. If you want to improve your exercise bonus, you should again solve and submit all problem sets; then, the better of the previous and new bonus counts. This only holds for the total exercise bonus, not for individual problems or sheets.

Certificates: Your final grade will appear on your certificate for the R course (provided upon request), but not on the bachelor certificate; there, the R-lecture grade is listed as either "passed/failed".

Basic and Orientation Exam (Grundlagen- und Orientierungsprüfung ([GOP](#)): Since the WiSe 23/24 the R course is part of the GOP. You must therefore pass the R exam by the end of the first semester. You may repeat it once at the next possible date (in the following year). Altogether you thus have four attempts to pass the exam: (main & retake exam)x(semester 1 & 3).