Features of a good exercise answer

Ability for systematic problem solving is very important because it eases solving challenging problems and improves academic skills. A logical answer is also easier to follow.

- If applicable, sketch a figure of the situation, mark the used variables, dimensions, vectors etc. into the figure. This makes it easier to piece together the situation.
- Give a source of information, especially if it is other than the course book. This is important for the confirmation of the information. Formulas of the course book can directly be cited using the number, e.g., (2.13.)
- Apply a validated methodology – i.e., mathematical model, computer simulation, measurement, statistical analysis, optimization technique, analysis based on examples, comparison with a known/existing/valid result, qualitative analysis (survey, interview etc.).
- Justify/explain the applied methodology physically and explain how they relate to the given problem. Find out in which section of the course book (or other source) this information can be found.
- Explain the new/unknown variables and give their units. This helps you to master the scope of the problem.
    - E.g., V^+ = voltage of a signal propagating to positive z direction, unit V.
- Let your presentation proceed systematically and explain the main principles even though they have not been explicitly asked.
- Write all the intermediate steps of the methodology clearly so that you understand them. Give assumptions that you use.
- If a numeric final answer is asked, substitute the numerical values to the formula with the units. Make sure that the unit of the end answer is correct.
- Give the final answer in the same number of significant digits as the most inaccurate starting value but use more significant digits in the intermediate phases.
    - E.g., if the starting value is a physical quantity, e.g., voltage V = 1.0 V (two significant digits!), give the final answer also using two significant digits, too. This is because the physical, measurable value is not fully accurate.
- Ponder whether your final answer makes sense. Justify the answer based on physical understanding. Typical problems of this course have a simplified connection to the real world. It is recommended to use common sense, too!

Grading instruction of the exercise problems

Each problem is graded on a scale of 0–4 points according to the following grading matrix.

Evaluation object	**← lower points**			**increase points →**	
Presentation & justifications written justifications, presentations (incl. sketch figures), understanding	There are no written justifications (e.g., it is not clear what theory or principle the answer is based on), presentation is unreasoned (e.g., it is impossible to follow the answer) or the problem instruction is understood totally wrong.		There is still room for improvement in the justifications. Some verbal justifications have been written (e.g., single keywords), but it is not clear from the answer whether the subject of the problem has really been understood. The presentation is somewhat logical. A sketch figure may have been used to clarify the situation.		The answer is well justified. Written justifications are sufficient (e.g., complete sentences written in using own words) and especially the answer shows that the subject has been understood. If applicable, a sketch figure may improve the comprehensibility of the answer.
Calculations mathematical intermediate steps, used symbols, numerical final answer	The mathematical calculation is completely incorrect, unjustified, or the intermediate steps are not shown at all (e.g., the answer does not show how the final stage was reached). Possibly the numerical result is non-sense (e.g., in the wrong scale) or unphysical.		In principle, the mathematical reasoning is correct, but some calculation errors may occur, or some intermediate steps may be missing. It may be unclear, what are the used symbols, or which numerical values are used for reaching the final answer. The numerical result may be realistic, but possibly wrong. The numerical final answer may have been given with completely wrong number of significant digits.		The mathematical intermediate steps are sufficient and valid. The final numerical answer is reasonable and correct (e.g., a small calculation error that occurred at the end is ok). Depending on the situation, the correctness of the final answer has been considered.
Extent of the answer Has one answered all the parts of the problem?	A significant part of the problem is missing. (x 0.25)		About half of the problem is done (x 0.5).	Most of the task done. (x 0.75)	Every question of the problem has been answered precisely. (x 1.0)
Overall evaluation based on above:					
Grade (points)	0	1	2	3	4