

# Maple T.A. in Mathematical Education of Engineers in Austria

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**Abstract.** One of the problems for academic teachers in the beginning of bachelor studies is to deal with different levels of knowledge and a high amount of content which has to be transferred to the students. Especially in the field of engineering studies this problem occurs in the mathematical courses. There are students who graduated from different types of school with various mathematical backgrounds which should gain the same mathematical level within the first three semesters. Additive the engineers should also be able to apply this mathematical knowledge to solve technical problems in several subjects.

At the Vienna University of Technology the lecturers in mathematics for engineers are faced with these problems described above. Due to this a refresher course was established in 2008 for the beginning of the first semester, to regain the partly lost mathematical abilities. This is necessary to enable the students to follow the technical subjects in a proper way. The second challenge is to teach higher mathematics with a lot of exercises in a short period of time in the first, second and third semester. Every mathematical course has common requirements: Practice, exercises and routine.

For this part Maple T.A. is applied. Maple T.A. offers a platform for intensive and continuous training possibilities for students. Another requirement is to process a huge amount of students. In the refresher course there are two cycles with around 800 students each, in the higher mathematical education (for electrical engineers) there are around 300 students in the courses. Maple T.A. offers a comfortable way to offer a lot of examinations in an efficient way regarding time and work load for students and lecturers. The usage of Maple T.A. has influenced the structure of the course as well. Due to the big amount of examples it is possible to offer homework as a preparation for the tests within the semester. An Aim was to transmit a clear expectation for the tests and to enable the right way of preparation for the students. In the last cycle of the higher mathematical course the final written examination for the lecture was given via Maple T.A. as a prototype. This method of examination has to be improved and extended in the next years.

Additionally Maple T.A. offers a comfortable way to randomize examples which an issue is regarding cheating during an exam. With sufficient randomization of examples the possibility of cheating is very low and the electronic tests are comparable with a high regulated written exam. Another advantage of Maple T.A. is the connection with Moodle. The eLearning system at Vienna University of Technology is based on Moodle. This connection eases the administration of results of tests, homework and examination. A nice benefit for the students is that the results are transparent and always available as well.