

## STUDY OF STUDENTS' PRESENCE IN LECTURES INFLUENCE ON THEIR EXAMINATION RESULTS

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**Abstract.** In the paper the analysis results of the mutual relationship between the percentage of students presence in lectures during the whole semester, results of the written part of the exam and the exam overall results are published. The exam has two parts – written and oral. The analysis concerns the subject “Basic Engineering technologies”, which is compulsory for the students of the programs “Trading and Dealing in Machinery and Equipment” and “Information and Management Technologies in Agri-Food complex”, for all other subjects of our faculty it is optional. By the analysis of the collected data the mutual relationship between the percentage of student presence in lectures, written part results of the exam and overall exam results was proved.

**Keywords:** lecture, seminar, test, exam, statistics.

### Introduction

The Technical Faculty of the Czech University of Life Sciences in Prague offers today seven accredited study programs of the Bachelor and Master Study, namely:

- Farm Machinery and Equipment;
- Road and City Automobile Transport;
- Waste Management Methods and Technologies;
- Building Construction Technologies and Equipment;
- Trading and Dealing in Machinery and Equipment;
- Information and Management Technologies in Agri-Food Complex;
- Machinery and Landscape Reclamation and Maintenance.

And one program of reassuming the Magter Study: Technology and Environmental Engineering.

For students of all above mentioned programs our department guarantees the teaching of compulsory and optional courses related to the subjects “Material Science” and “Engineering Technologies”. But the extent and depth of single subjects are for various programs different and they depend on the student profile.

### Materials and methods

For students of the programs “Trading and Dealing in Machinery and Equipment” and “Information and Management Technologies in Agri-Food Complex” our department guarantees the teaching of the compulsory subject “Basic Engineering Technologies”. Of course, this subject can be studied as optional by students of all programs of our faculty. In recent years it is studied (on average) by about 100 students a year.

According to the study regulations valid in our university the student's duty is to attend lectures and seminars of any subject if the subject is registered for the study. And it does not matter whether this subject is for the program compulsory or optional and whether he/she registered it obligatorily or voluntarily.

The subject “Basic Engineering Technologies” is taught weekly two hours of lessons (of the 45 minutes duration) and two hours of seminars weekly. The final exam has two parts – written and oral. The written part contains the test of six questions, which have to be answered. Every correct answer is assessed by 1 point, an answer which is not quite correct or which is not complete by 0.5 points, a wrong answer by 0 points.

For the overall result the points of the exam written part are taken into account as follows: 6.0 and 5.5 points = assessment “1”, 5.0 and 4.5 points = assessment “2”, 4.0 and 3.5 points = assessment “3”, 3.0 and fewer = assessment “4”.

In the Czech Republic universities the four-level system of student assessment is used. The assessment “1” is the best; the assessment “4” is the worst. For successful exam completion the student has to reach the assessment “1”, “2” or “3”. Reaching the assessment “4” the student has to

pass the resit. According to the valid regulations today it is possible to pass the resit only two times. If the exam is not successful in the third attempt, the student has to repeat the subject in the following year (so-called second enrollment). But this is possible only at two subjects. At more subjects the student has to repeat the year.

In principle it is valid that both exam parts, written and oral, should be sailed through not less than at the assessment “3”. It is necessary to emphasize that the presence in lectures is not assessed. The exam result depends only on the written and oral part.

The questions of the written and oral exam parts proceed from the subject content and they include the topics which students are acquainted with in lectures, seminars and laboratory workshops and which students have at disposal in university textbooks and in web study sources.

The lectures of the subject “Basic Engineering Technologies” include all basic engineering technologies, namely foundry work, forming operations [1 – 5], welding [6; 7], soldering and brazing [8], adhesive bonding [9], surface protection [10; 11], plastics processing, engineering metrology and cutting operations [12 – 14]. The lectures are completed by next themes carried out in practice, namely technological processes of casting products, non-destructive testing, technological tests, metal hot working, metal cold working, spot welding, bonding of metallic and nonmetallic materials, length and angle measuring, control of gearings and threads, measuring of cutting edge temperature at turning etc. For study the students have at disposal, besides the own notes from lectures, the university textbooks. Next sources for study are at disposal in electronic form in the university web.

The results of several presence checks in lectures, results of the written part of the exam and overall results at the oral part of the exam were the basis for the analysis published in this paper.

## Results and discussion

The data collected from February, 2011 till September, 2011 were analyzed and afterwards statistically processed using the programs Excel and Statistica.

The graphical dependences presented in the following figures are the result of this evaluation. On three coordinate axis x, y, z the following parameters are presented:

- percentage presence in lectures,
- assessment of the exam written part in points,
- exam overall assessment, marking.

Fig. 1 presents the exam results of the 1<sup>st</sup> (regular) term, Fig. 2 of the 2<sup>nd</sup> term (the 1<sup>st</sup> resit) and Fig. 3 of the 3<sup>rd</sup> term (the 2<sup>nd</sup> resit).

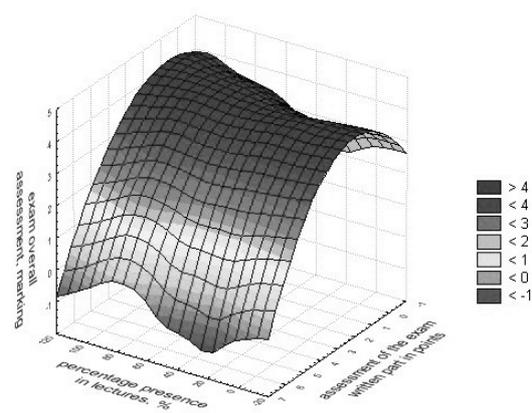
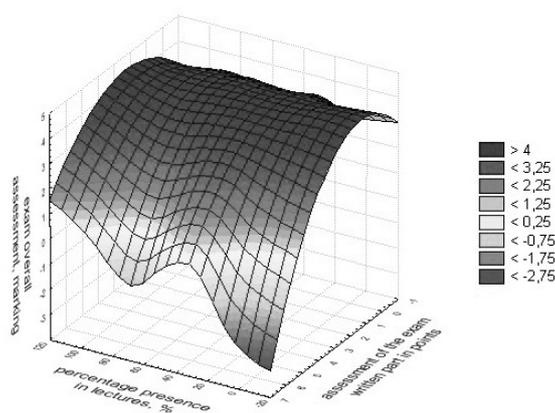


Fig. 1. Results of the 1<sup>st</sup> (regular) term

Fig. 2. Results of the 2<sup>nd</sup> term (the 1<sup>st</sup> resit)

By definition of the solved problem it follows that the presence in lectures can be only in the range between 0 and 100 %, points of the written part between 0 and 6, overall results between 1 and 4.

As it is evident from Fig. 1 to 3 the area values of the 3D graphs, processed using the program Statistica, deviate from these limits. Therefore, the figures were adjusted so that the values of all three axes were manually set in accordance with the foregoing paragraph.

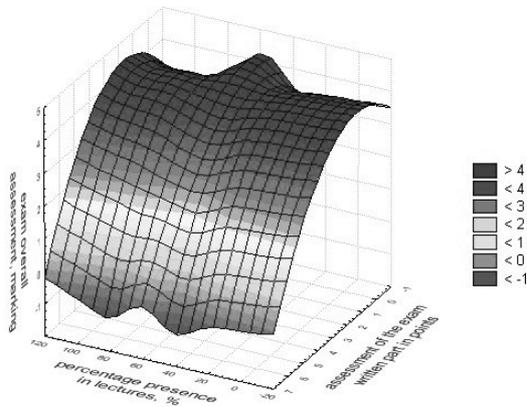


Fig. 3. Results of the 3<sup>rd</sup> term (the 2<sup>nd</sup> resit)

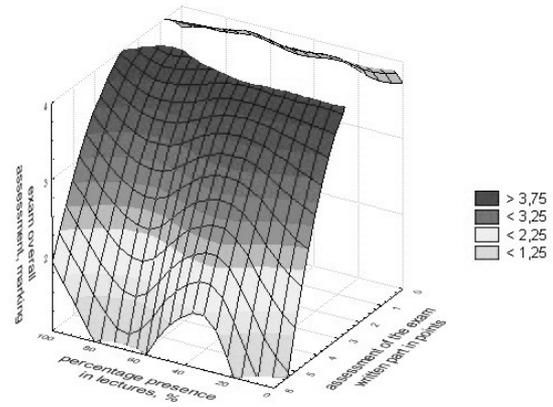


Fig. 4. Results of the 1<sup>st</sup> term – adjusted

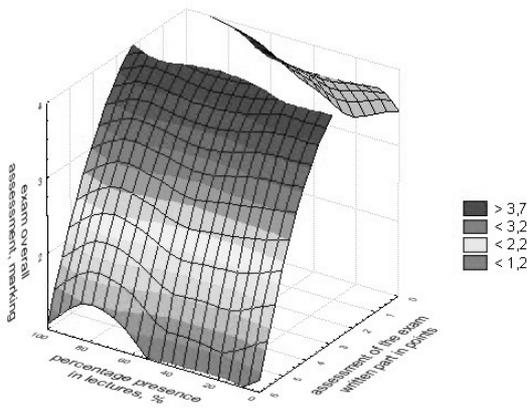


Fig. 5. Results of the 2<sup>nd</sup> term – adjusted

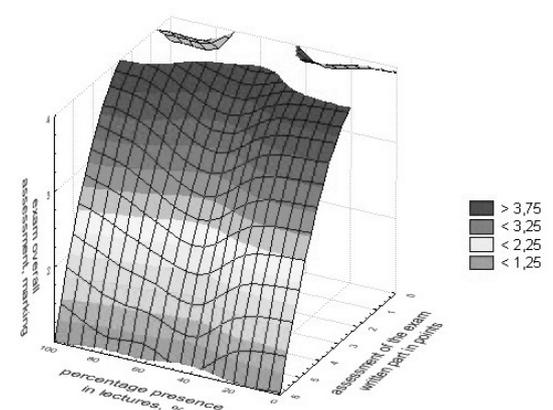


Fig. 6. Results of the 3<sup>rd</sup> term - adjusted

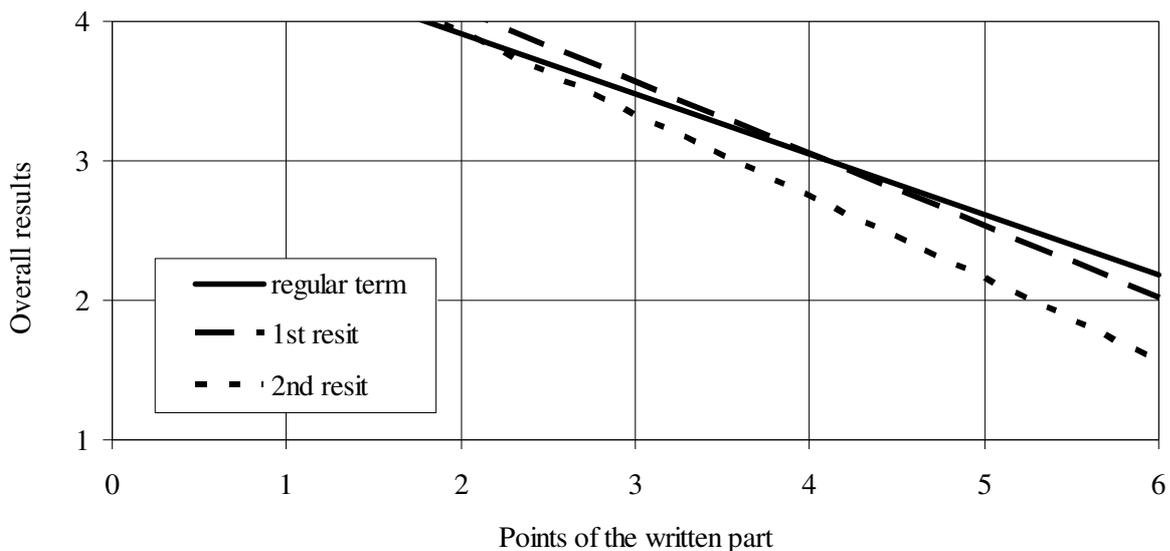


Fig. 7. Results of all exam terms – dependence of assessment on the point number of the written part

By this adjustment the originally continuous surfaces (Fig. 1 to 3) were transformed into discontinuous ones (Fig. 4 to 6), because only real parts of processed surfaces were presented.

Fig. 7 presents the graphical dependence between the overall results and points gained at the exam written part. From this figure it follows that between the first and the second term too substantial influence does not exist. The students pay the intensified attention only to the last possible term of the exam. At the equal point number from the written part they have better results at the oral part and therefore better exam results.

From the foregoing figures the relation between three observed parameters, namely the percentage of students' presence in lectures, their points gained at the exam written part and the exam overall results, is evident. In accordance with the presumption it is evident that:

- students of high presence in lectures obtained at the written part significantly higher assessment (up to 1.28 points from 6 possible ones) compared with the students who visited lectures less or not at all;
- students whose points gain at the exam written part was higher were subsequently better marked (lower up to 0.54 mark from 4 possible);
- most considerable result differences are at the 3<sup>rd</sup> exam term (the 2<sup>nd</sup> resit), almost equally considerable with the results of the regular term; on the contrary the minimal result differences were found at the results of the second exam term (the 1<sup>st</sup> resit);
- most successful students are at the last possible exam term, where in the case of failure problems with the subsequent study can occur.

## Conclusions

In the paper the results of the mutual correlation between the student presence in lectures during the semester, written part results of the exam and the exam total results are published. The carried out analysis proved that the success rate is in close relation with the student activity during the whole semester and with the intensity and efficiency of their careful preparation before the exam. The found out differences are relatively significant. In the case of the dutiful approach to the study the student can gain better assessment on average of more than 21 % at the written part and subsequently up to 13.5 % better marking compared to the students who neglect teaching during the semester.

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