

## THE POSTGRADUATE EDUCATION ON THE FACULTY OF METALLURGY AND MATERIAL ENGINEERING, VSB – TECHNICAL UNIVERSITY OF OSTRAVA (CZECH REPUBLIC)

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**Abstract**  $\frac{3}{4}$  *The faculty is located in the north-Moravian part of the Czech Republic. The region has historically developed as a centre of coalmines, metallurgical, chemical and machinery industry. During the years of socialistic regime all these branches have been heavily overdimensioned. The economic transformation in the Czech republic after the year 1989 demanded also the reconstruction of the general educational system. This paper deals with the partial problem – education of the postgraduates, Ph.D. – degree, which has been solved simultaneously in the general framework. The goal is to prepare highly qualified, flexible workers for research and new technologies in the development of the region and also for the expected affiliation to the European Community. The article is going to describe the methods of education, different forms of study, newly created branches and innovation of traditional branches, where the faculty holds monopoly position. The postgraduate education belongs to the most important tasks of the technical universities. The method of financial support, using different resources (grant policy, sponsoring of companies, etc.) is also necessary condition to fulfil this task.*

**Index Terms**  $\frac{3}{4}$  *Curricula, education, postgraduate education.*

### THE ORGANISATION

The postgraduate study – Ph.D. curricula – is the integral part of the university educational system. Besides B.Sc. and M.Sc. courses it represents the highest level of scientific and technical education. The necessary and obligatory condition for all applicants is M.Sc. degree in the appropriate branch. The applicants are recruited either of the new graduated, talented students as well as from the older graduates having been already employed in the industry, research, and different companies.

All the applicants have to pass the introductory interview before a group of experts appointed by the dean of faculty. The professional ability, practice, knowledge of foreign languages is in this way examined and recommendation made for the dean, who has the final right either admit or deny the application.

If the decision is for the applicant favourable, then there are two possible ways of continuation:

- Internal (time-limit 3years)
- External (Distant, time-limit 5 years)

Independently of the above mentioned form, every student is allotted to his own tutor, who must be the professor, associate professor or doctor of Science (Dr.Sc.). The tutor decides about the topic of Ph.D. work, controls the student's work, consults the problems and is also responsible for the student.

The student – in cooperation with his tutor – works out the plan of professional examinations, laboratory and experimental work, references, special lesson. The plan of examinations includes 5 – 6 specialisation subjects, some of these are obligatory, in some cases has the student the right of choice, but always with agreement of his tutor. The concept of the examination program is influenced by two main factors: the branch and the topic of work. The students have the right of choice among most frequent languages English, German, French, and Spanish. The majority of students prefer English. At the single, separate examination, must be present the appropriate examiner and the tutor. The result is recorded in written form.

The terms of examination plan are yearly checked by the and consequently by the scientific council of the faculty, the results are placed in the written record. If the student – without appropriate ground, does not fulfil the plan, can be rebuked. If this situation repeats or outlasts, the study can be suspended. There exist also the possibility for interrupting and prolongation of study for serious reasons, for instance health, motherhood in case of women.

If the study continues regularly, the student passes all the predefined examinations and has reached some partial results, concerning the topic of his Ph.D. work, then somewhere in the middle of the time-limit follows so called rigorous examination, again before the commission of experts, consisting of two parts:

- presentation of the contemporaneously obtained results and the outlooks of the Ph.D. work
- examinations of three obligatory predefined subjects

The first part must be accompanied by an experts report. As a rule, the result is again recorded in the written form.

In the rest of the time limit the student finishes his PhD work, theoretically and experimentally. Then the student defends his Ph.D.-thesis before the experts' commissions, consisting of 7 – 9 members, appointed by the dean of the

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faculty. The Ph.D.–thesis must be submitted to the three experts reports. The experts have to be of the same rank, as the tutor, e.g. professor, associate professor or doctor of Science. Only one of them can be the member of faculty, the others must belong to another universities or institutions.

The date and topic of Ph.D.–thesis must be publicly announced eight weeks ahead. The topic is send to the institutions, which can be in this problem interested. The event itself is publicly open.

The internal students are due to perform a certain pedagogical activity. They participate together with senior lecturers in seminars and laboratories in education of lower level students. 3-5 hours weekly. On the other side, special lectures are run for then by faculty or other institutions experts.

All the organisation measures are submitted and in accordance with the laws of the Czech Republic, dealing with education on universities.

### THE STRUCTURE

The structure of the postgraduate education on the Faculty is the continuation of three keys domains, performed by the faculty; this is shown in the following tables I. – III. and Figure 1:

TABLE I

STRUCTURE OF THE POSTGRADUATE EDUCATION ON THE FACULTY

Keys domains	Branches
<b>Metallurgy</b>	Technology of Metals and Alloys Chemical Metallurgy Foundry Material Forming Thermal Technique in Industry Automation of Technological Processes Environmental Protection in Industry Economics and Management of Enterprises
<b>Process Engineering</b>	Chemical and Energetic Processing of Fuels Quality Management
<b>Physical and Material Engineering</b>	Material Engineering Physical Metallurgy and Boundary States of Materials

TABLE II.

NUMBER AND STRUCTURE OF STUDENTS OF THE FACULTY OF METALLURGY AND MATERIAL ENGINEERING IN YEARS 1996-2000

Type and form of study	Year				
	1996	1997	1998	1999	2000
M.Sc. students – full-time study	985	1104	1263	1249	1021
B.Sc. students – full-time study	113	133	132	147	133
M.Sc. and B.Sc. students – external study	109	148	207	436	410
Ph.D. students - internal	23	27	35	57	60
Ph.D. students - external	70	100	109	117	146
Total Ph.D. students	93	127	144	174	206
Total number of students	1300	1512	1746	2006	1770
Ph.D. students in [%]	7.15	8.40	8.25	8.67	11.64

TABLE III.

NUMBER OF PH.D. STUDENTS IN INDIVIDUAL KEYS DOMAINS IN YEARS 1996-2000

Keys domain	1996		1997		1998		1999		2000	
	I	E	I	E	I	E	I	E	I	E
<b>Metallurgy</b>	14	52	18	68	27	68	41	77	44	95
<b>Process Engineering</b>	3	4	3	14	7	22	11	25	9	34
<b>Physical and Material Engineering</b>	6	14	6	18	1	19	5	15	7	17

NOTE: I – internal study, E – external study

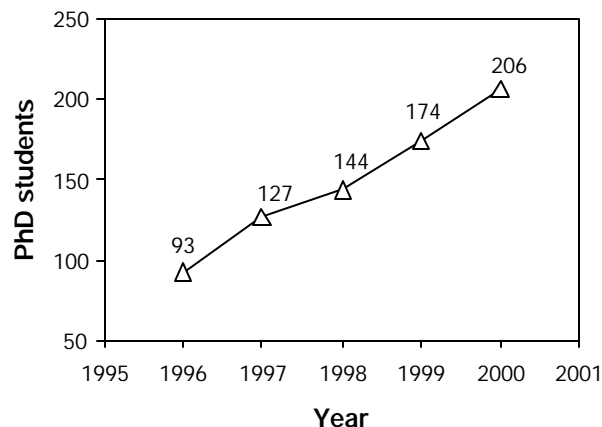


FIGURE 1

INCREASING NUMBER OF PH.D. STUDENTS IN THE FACULTY OF METALLURGY AND MATERIAL ENGINEERING, VSB-TU OSTRAVA

The faculty belongs to the state university. Therefore all the above mentioned branches have been already approved by the state governmental education authorities.

The branch council, appointed by the dean of the faculty, controls all the activities of branches. The results are regularly checked by the scientific council of the faculty.

### THE FINANCING

#### Personal Financing

The internal students, if they fulfil all their duties, obtain regularly during their stay on the faculty the scholarship. This is paid by the faculty always on the recommendation of the student's tutor. The height of the scholarship depends also partially on the results of the student. As the university is the state university, the amount of these expenses in the budget of faculty and university is covered from the resources of Czech government, which in this form support the education of Ph.D. students.

The external students, as they are employed, obtain from the university no financial support.

The Czech citizens, regardless of the form of study, e.g. internal or external, pay no fee to the university.

The transition between both forms is theoretically possible. In some cases is realized only one-direction

transition, from internal to external form, if the internal student needs to earn more money and finds a profitable job.

The foreign students can participate in the Ph.D. education either on direct scholarship of the Czech government or at their own expenditures.

### Research financing

First is to say that the decision about the topic of Ph.D. work is fully in hand of the faculty. This work on technical university needs, as a rule, also the financial support, covering the research – analysis, measurements, experimental equipment, materials, computation services, workshop services and so forth. The situation is relatively easier in the case of internal students. They mainly work on partial, separate and independent tasks of the long-termed grants, which have been won by the faculty departments. The resources of grants are different: Czech Grant Agency, Grant Agencies of government departments, grants are also in advance financially planned and underlaid.

On the contrary, the work of external student is predominantly financially covered and supported by the companies, where they are employed. Sometimes – at the starting point of the work – more complicated situation arises as the confrontation between short – termed and more practical demands of the company and the long – termed and scientific view of the university. Again, in most cases this situation is overdone and the mutual agreement is reached. The reasonable companies, especially the great metallurgical companies in the north – Moravian region, which have to solve the complicated problems of restructuring, appreciate the cooperation with the university and initiate contracts with individual departments of the faculty. Also this continually developing process of balancing different views improves the bilateral relations between the faculty and industry.

### CONCLUSION

The paper have dealt with structure, organisation and financing of postgraduate education, which have become the regular part of curricula of Faculty of Metallurgy and Materials Engineering, VŠB – TU Ostrava. The increasing number of Ph.D. students proves the interest concerning the highest level of scientific and technical education.

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