



Mechanical Engineering Sarajevo, Faculty of Mechanical Engineering East Sarajevo and Faculty of Mechanical Engineering Tuzla (Figure 2).

It is important to emphasize that the number of students from the north-eastern region of Bosnia and Herzegovina also attended other higher education institutions in neighbouring countries (CROATIA - Faculty of Mechanical Engineering Slavonski Brod, Faculty of Mechanical Engineering and Naval Architecture Zagreb, SERBIA - Faculty of Mechanical Engineering Belgrade, Faculty of Technical Sciences Novi Sad, and Faculty of Mechanical Engineering Karagujevac). Because estimation that a relatively small number of students from north-eastern region of Bosnia and Herzegovina is on mentioned Faculties in neighbouring countries and because of other objective reasons, created questionnaires wasn't delivered to these institutions in neighbouring countries.

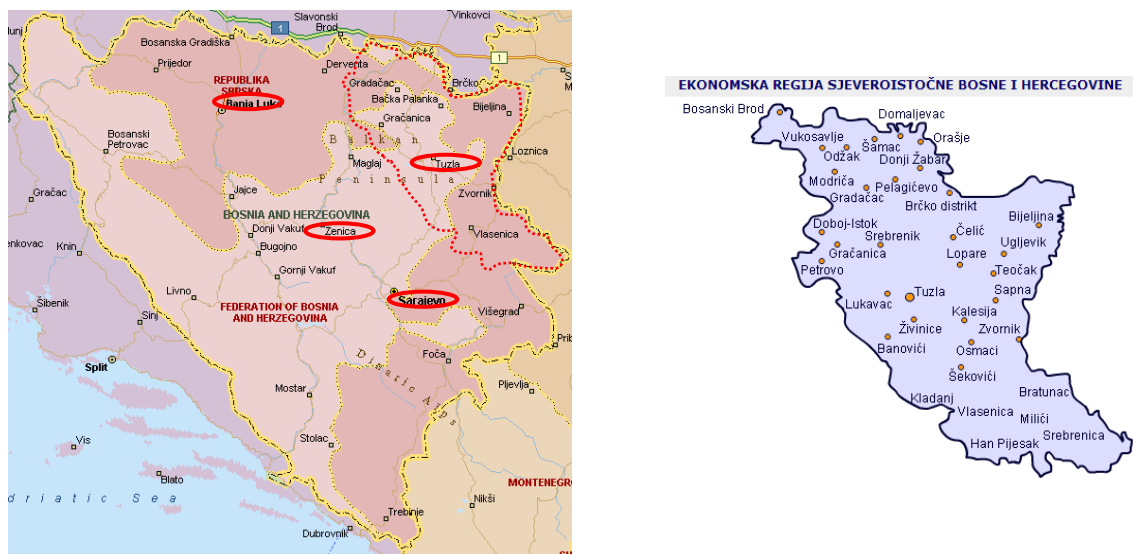


Figure 2 Economic region of north-east Bosnia and Herzegovina

To selected universities were sent questionnaires with the same request to fill and submit them to the Regional Development Agency north-eastern Bosnia and Herzegovina - NERDA. Unfortunately, despite to taken activities filled questioners with data are provided only the following institutions: Faculty of Mechanical Engineering Zenica, Faculty of Mechanical Engineering Sarajevo and Faculty of Mechanical Engineering Tuzla. Based on collected data updating and analyzing the submitted data was done.

By analysis of the number of students was noticed that the Faculty of Mechanical Engineering Sarajevo in their educational process include the highest number of students, leads in the number of departments and in the number of full-time employees, Figure 3

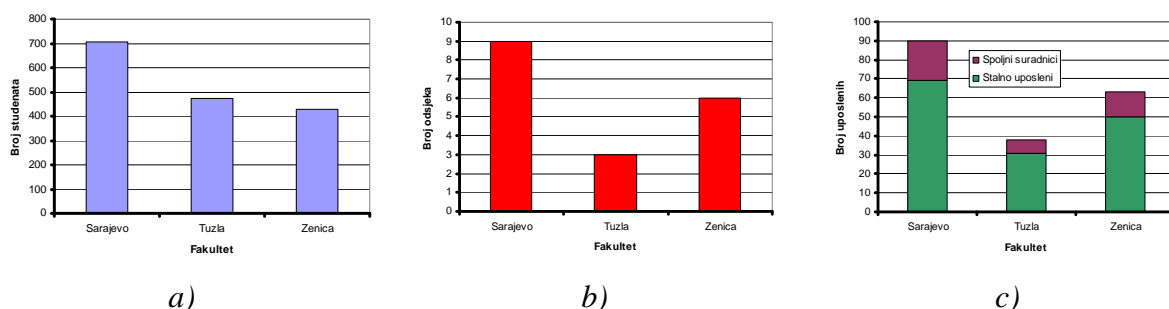


Figure 3 a) The number of students per faculty, b) the number of departments per faculty, c) the number of full-time employees and external collaborators per faculty

Departments at analyzed faculties are presented by Table 1

Table 1 Overview of departments at observed Faculties of Mechanical Engineering

Faculty of Mechanical Engineering Sarajevo	Faculty of Mechanical Engineering Tuzla	Faculty of Mechanical Engineering Zenica
Engines and vehicles	Energetics	Engineering design of products
Defence technologies	Production	Management of production technologies
Mechanical constructions	Mechatronic	Engineering ecology
Production technique	-	Maintenance
Energetics processing	-	Production business MSP
Mechanical production engineering	-	Mechanical engineering in general
Industrial engineering and management	-	-
Energetic processing technique and environmental engineering	-	-

Based on available data the total number of students per year by faculties are presented by Figure 4, while the number of students per faculty departments presented are presented by Figure 5

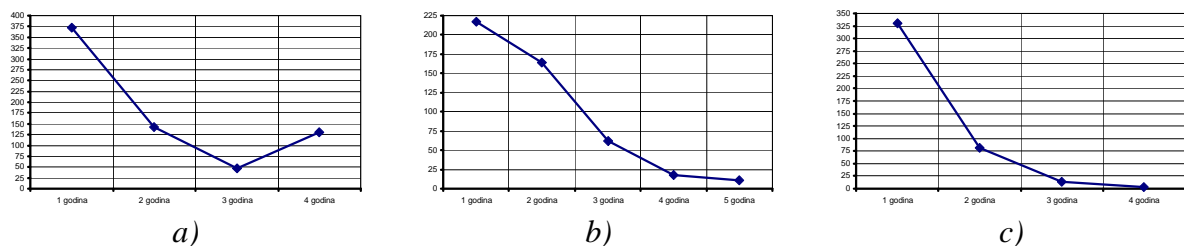


Figure 4. Total number of students per year: a) Faculty of Mechanical Engineering Sarajevo, b) Faculty of Mechanical Engineering Tuzla, c) Faculty of Mechanical Engineering Zenica

On the basis of submitted data diagram could not be defined

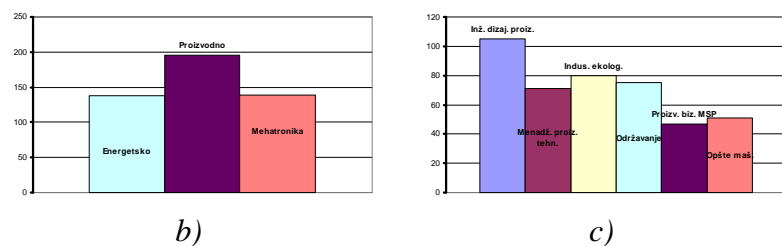


Figure 5 Number of students per departments: a) Faculty of Mechanical Engineering Sarajevo, b) Faculty of Mechanical Engineering Tuzla, c) Faculty of Mechanical Engineering Zenica

As it can be seen on the presented diagrams (Fig. 4) the number of students in the first two years of study is rapidly falling. The falling of student's number continued in the third and fourth years too, but with considerably less intensity. This indicator shows a strong selection in the "general" phase of the study (1<sup>st</sup> and 2<sup>nd</sup> years) when many students give up on further education. The reasons for that situation are numerous and some of them are: students enrolling at the Faculties to achieve other rights, poor quality of previous knowledge from secondary education, hard adoption of to new conditions and new environment at Faculties, high criterion in some courses at two first years of study, heavy loaded curricula, etc. Unlike the student who dropping at the first two years of study, students at the third and fourth year of study usually sooner or later finish the study, while still a certain number of

them giving up due to various reasons such as: finding employment, going abroad, and sometimes because of financial reasons.

The collected data are also used for the analysis of relations between the number of enrolled students in the first year of undergraduate studies and the number of graduate students per the same year, presented by Figure 6.

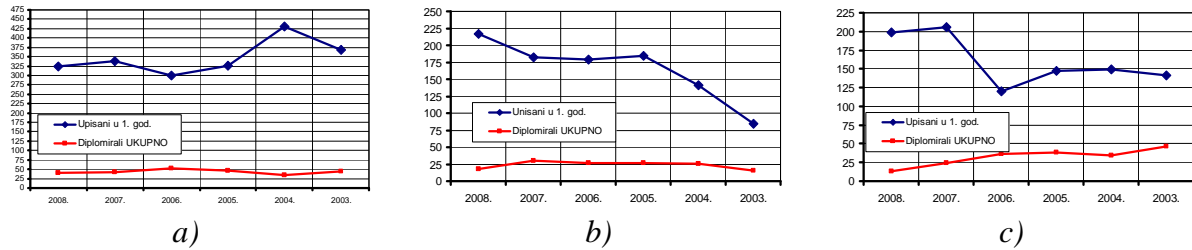


Figure 6 Number of entries/ graduates per years, a) Faculty of Mechanical Engineering Sarajevo, b) Faculty of Mechanical Engineering Tuzla, c) Faculty of Mechanical Engineering Zenica

On the basis of figure 6 it is possible to notice two distinct trends. The Faculty of Mechanical Engineering Sarajevo, according to presented data is in the stable stage with optimal utilization of educational capacity which is indicating by approximately constant number of entries / graduates per year for interval 2003<sup>rd</sup> ÷ 2008<sup>th</sup>. It is expected that this trend to continue in the future. On the opposite side Faculties of Mechanical Engineering in Tuzla and in Zenica are in the expansion phase and the number of students grows from year to year. Of course, it can not be expected that the above trend continue indefinitely because of capacity constraints – space capacities and science teaching facilities. The result of the rapid increasing in the number of students at those two faculties is a significant decline between the average number of students who graduated and relation to the number who enrolled to faculties in the same year (Figure 7).

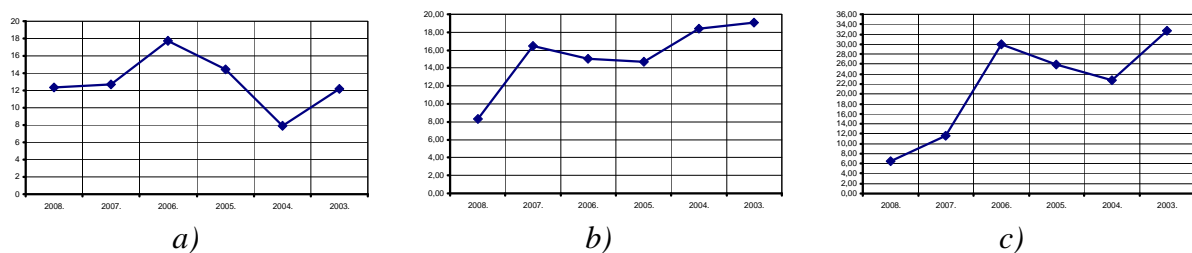


Figure 7 The proportion of graduates in relation to enrolled students per years: a) Faculty of Mechanical Engineering Sarajevo, b) Faculty of Mechanical Engineering Tuzla, c) Faculty of Mechanical Engineering Zenica

Also, for all three analyzed Faculties in period 2003 ÷ 2008 it can be seen nearly constant trend in the number of students who graduated. It is expected that above trend continues in the future with a small increase in the number of graduate students at the Faculty of Mechanical Engineering Tuzla and Faculty of Mechanical Engineering Zenica as a result of increased enrolment in the first year of undergraduate study. The collected data were used for calculation of average number of graduates for the period 2003 ÷ 2008 years and the average percentage of graduates in relation to the number of students enrolled in the current year for the specified period, Table 2

Table 2 Average number of graduates for the period 2003 ÷ 2008 years, and the average percentage of graduates in relation to the number of students enrolled in the current year for the period 2003 ÷ 2008 years

Faculty of Mechanical Engineering	Average number of graduates	The average percentage of graduates in relation to the number of students enrolled in the current year
Sarajevo	44	12,9
Tuzla	24	15,3
Zenica	32	21,6

So on the basis of table 2 and diagrams presented in figure 6 and 7 can be expected to continue the trend of the average number of mechanical graduate engineers per year presented by table 2. However, it is important to note that only students from Faculty of Mechanical Engineering Tuzla are student population that sees its future in the economic region of northeast Bosnia and Herzegovina, while the remaining two faculties i.e. Faculties of Mechanical in Sarajevo and Zenica educate personnel for other regions with small participation of students from this region. Also, it is important to note that students who study in two mentioned faculties (Sarajevo and Zenica) in great number after graduation at the home institutions will stay in these towns/regions, which refers in particular to Sarajevo. The above mentioned data provided specific insight into the educational potential of the individual faculties, which can be made available to firms from an economic region of north-eastern Bosnia and Herzegovina, table 3.

Table 3 Educational potential of the analyzed Mechanical faculties (education in ...)

Section	Sarajevo	Tuzla	Zenica
NC/CNC operators	YES	YES	YES
CAD/CAM software	YES	YES	YES
Welding	YES	YES	NO
Machinist	YES	NO	NO
Maintenance of motor vehicles	<b>YES</b>	NO	NO
Foreign language	DA	NO	NO
IT software (MS Windows, MS Office, ...)	YES	YES	YES
Rapid Prototyping	NO	<b>YES</b>	NO
Reverse Engineering	NO	<b>YES</b>	NO
CFD software	YES	YES	NO
Roughness measurement and measurements of materials characteristics	YES	YES	YES
Measurement Equipment CMM	NO	NO	<b>YES</b>
Optimisation of production processes	YES	YES	YES
Design of technological processes	YES	YES	YES

From the table 3 it can be seen that at all analyzed faculties had similar potential for additional training, with the some specific educational options (red bold letters in the table 3). This fact indicates the possibility of competition between faculties at providing some specific services, from this fact companies should take an advantage and looking the best ration between economic costs and quality of offered education. It is also important to emphasize that at analyzed faculties there are certain specific areas which are characteristic only for the corresponding faculties. At the end it can be noted that in all analyzed faculties have needs for purchasing and installation of new modern laboratory equipment by which will the potential

of these institutions as well as practical knowledge of students rise up to a higher level. In this area there are numerous possibilities for mutual cooperation between higher education institutions, institutes, government and NGO sector, and especially metal-processing companies in economic region of north-eastern Bosnia and Herzegovina. Unfortunately those possibilities are not well utilized and coordinated.

Despite to numerous programs for supporting and co financing of this area neither a faculties neither an other institutions are not taken an active role in obtaining the necessary financial resources that would create a significant step forward. Of course in this area there are certain exceptions too that resulted in raising the competitiveness of faculties and knowledges provided to students at a significantly higher level, which is apart from certain economic effects had a greater impact.