



THE BOLOGNA PROCESS AT RAILWAY COLLEGE IN BELGRADE

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Abstract: Fundamental process of transforming Railway College into Railway College of Vocational Studies will be presented in this paper. Educational process will be put in accordance with European trends in order to attain more effective incorporation into European educational systems. In that way, students will be enabled to enter railway systems of Serbia and Europe more effectively. As a consequence, the Railway College of Vocational Studies will take its part in development of Serbian Railway and the region itself.

Key words: *The Bologna process, educational process, profession study*

1. INTRODUCTION

The aim of the Bologna process is to introduce appropriate standards into higher education institutions to create a unique European educational system. In order that our College could be accredited by the appointed commission, we had to do a certain restructuring of both the institution itself and the curriculum.

2. HIGHER EDUCATION INSTITUTION STANDARDS

Some of the most significant standards related to a higher education institution will be presented here, as well as the description of their application in our College.

Standard 1: Basic Tasks and Aims of a Higher Education Institution

A higher education institution has determined basic tasks and aims which are in accordance with the aims of higher education in Serbia determined by the law.

The Railway College of Vocational Studies educates the students of basic and specialized

vocational studies, primarily for the railway, and other forms of transport as well, which in combination with the railway transport make up a unique transportation system.

The basic studies curriculum should provide the students with necessary knowledge and skills, primarily in the railway transport.

In the organizational structure of our railways and their corresponding jobs, the study programs for the three-year basic studies at the Railway College of Vocational Studies provide the graduate students with necessary knowledge and skills so that they can successfully perform the first degree jobs according to the determined systematizations of jobs and working tasks suited for the railway transport, while the specialized vocational studies provide necessary knowledge and skills for the second degree jobs.

Standard 2: Planning and Control

In order to realize its basic tasks and aims, a higher education institution plans and controls the results of all forms of its educational, scientific, artistic, research and professional activities within its scope of work.

In order to realize the basic tasks and aims, the College plans and controls the realization of

all activities within its scope of work. The planning is realized within the annual work programs of the College, based on a detailed analysis of internal and external influential factors. The essence of planning is based on a continual and systematic collection of adequate data and their expert processing. The drawn-up planning documents, as well as the results of planning, are realized in practice and are open to the public. The College regularly controls the realization of the set tasks, first of all the set educational aims. The control is exercised by comparing the set aims and tasks and the realized ones. The results are compared with the results of the College achieved in previous years, as well as with the results of similar higher education institutions in our country and in the world. The College permanently analyses the effectiveness of the achieved results and tries to improve and perfect them. A special commission does the planning and quality control; a number of students of the College are among its members.

Standard 3: Organization and Management

A higher education institution has an organizational structure and management system which provide the attainment of its aims and tasks.

The organizational structure of the Railway College of Vocational Studies comprises:

- the director as an executive organ,
- the College secretariat with the general and administrative work department,
- the students' affairs department,
- the financial and accounting department,
- the computer equipment and technical systems maintenance department,
- the research and development unit,
- the library, and
- the unit for students' food and accommodation.

Standard 4: Studies

The contents of qualifications and diplomas of individual types and levels of studies correspond to the character and aims of study programs. The study programs of a higher education institution are in accordance with the basic tasks and aims and serve to attain their fulfillment. A higher education institution plans, realizes, supervises, evaluates and improves the

quality of study programs in a systematic and effective way.

The studies at the College must be realized according to the approved study programs which comprise the three-year basic studies and one-year specialized vocational studies, after completing the basic studies. The study programs make up a whole comprising aims, structure and contents, policy and procedure of enrolling students, methods of learning, ways of knowledge assessment, results of teaching process and graduate students' competence. The curriculum is designed in such a way that, after completing the basic vocational studies, graduate students attain the following qualifications and competence:

- they are able to apply the achieved general knowledge, vocational knowledge and skills in their profession;
- they are able to transfer the achieved knowledge and skills to others successfully;
- they are able to collect and select important data and ideas effectively, to analyze and synthesize them, to suggest appropriate solutions and point out possible consequences accordingly;
- they are able to keep abreast of and apply the latest knowledge and new technology within their competence;
- they are able to use professional literature and other available information to solve concrete tasks;
- they are able to continue their professional training successfully after enrolling for specialized vocational or academic studies.

The study programs at the College are integrated with the basic tasks and aims, and contribute to their successful realization. Due to their importance, their application is continually analyzed and supervised at the College; their quality is evaluated and, if necessary, old and obsolete study programs are replaced with new, modern and up to date study programs.

Description of Qualification Denoting the Completion of Basic Vocational Studies (Bachelor's Degree)

Vocational railway transport engineer is qualified to make an analysis or synthesis, to foresee solutions and consequences when solving managerial, operational, practical and theoretical problems related to the technique and technology

of railway transport; he must master the methods and procedures regulating a safe operation of railway transport, independently and as a member of a team. Besides his capability to apply his theoretical knowledge and skills in practice, he must also develop his communicative abilities, resourcefulness and skillfulness defending his seminar papers, practical papers and diploma paper in public. He is qualified to develop criticism and self-criticism dealing with problems to be solved, and when applying the achieved knowledge in practice.

Vocational railway mechanical engineer is qualified to carry out operational, managerial, organizational and creative tasks in the field of mechanical engineering technique and technology. He is able to organize, manage and maintain constructions, permanent-way installations, systems, switches, main and auxiliary equipment for railway vehicles. He can manage spare parts, supplies and equipment; he is able to plan maintenance and control of operational readiness and reliability. He must also formulate and realize the process of undoing damage to traction and hauled vehicles in exploitation. He is qualified for the process of reconstruction and modification implementing modern solutions, as well as for using application schemes, projects, technical and overhaul documentation in the process of maintenance and exploitation.

Vocational transport electrical engineer is qualified to work as section head of railway electrical installations. He is able to organize and manage regular and investment maintenance of equipment and installations in his field. He makes daily working plans, controls their realization, and evaluates the quality of workers' performance. He prepares monthly reports on the scope of realized work on regular and investment maintenance, defects and disturbances on electrical installations, as well as on the regularity of railway transport. He also educates workers with lower qualifications in their field of specialization and regulations. He must coordinate the work with other professional services.

Vocational railway civil engineer is qualified to work as head of a permanent-way district. He organizes and manages the work dealing with using building technique in railway transport, and manages the processes of completing individual works of both current and investment maintenance on a railway line of a certain area.

Vocational commercial operation economist is qualified for commercial operations within the railway transport which are complex and united at big railway stations, for a number of railway stations on certain parts of a line, in executive units of transportation operations, as well as for specific jobs of railway economy and railway financial operations.

Standard 6. Teaching Staff

A higher education institution employs teachers, research workers and associates who through their scientific, artistic and teaching activities make the realization of basic tasks and aims of the institution possible. The teaching staff realizes study programs in a competent way, and performs other assigned tasks.

The Railway College of Vocational Studies has 17 full-time teachers (8 PhDs, 7 masters, 1 specialist, and 1 foreign language lecturer) and 1 associate (university-level specialist's training).

The College also has 27 part-time teachers (12 PhDs, 14 masters, and 1 specialist) and 14 associates (university-level specialist's training).

The teaching staff corresponds to the needs of study programs and is enough to cover the total number of teaching hours of study programs.

All the teachers and associates have all the necessary competence for the field and the subject they have been appointed and engaged for, so that the basic tasks and aims of the College can be achieved in educating students who are primarily oriented towards economy, particularly towards the railway.

There is an inseparable connection between the College and the railway which was the initiator and founder of the College. The College itself was founded to educate the personnel for the railway, and even now the railway offers support to the College and continues to demand the education of its personnel in accordance with the new times and railway modernization. That is why most part-time teachers are experts working for the railway which represents the College's home institution connected with economy.

The teachers and associates from the railway engaged by the College are mostly competent experts in the railway practice, who have received their doctor's and master's degrees, and who hold responsible and managerial positions in the big railway system.

Besides the full-time teaching staff, the College also employs teachers from other similar

and appropriate higher education institutions, which further contributes to the successful realization of study programs, all the assigned tasks, and meets the challenges of future times.

Standard 7. Non-teaching Staff

A higher education institution has a non-teaching staff which, through its professional work, contributes to a successful realization of study programs, basic tasks and aims of that institution.

The Railway College of Vocational Studies has 17 full-time members of the non-teaching staff. Their qualification structure is like this: two employees have a university-level specialist's training, seven employees have an advanced specialist's training, four employees have an intermediate specialist's training and four employees have elementary education.

According to the Book of regulations dealing with organization and systematization, the jobs being done within a separate organizational unit of the Secretariat are divided into the following four departments:

- legal and general matters department headed by the College's Secretary,
- accounting department headed by the chief accountant,
- teaching matters department headed by the teaching matters associate, and
- students' matters department headed by the coordinator and employee in charge of students' matters.

The College has optimal working conditions, space, equipment, expendable goods, etc. but in some working segments the non-teaching staff is overburdened, and sometimes there is a need to employ another worker.

In accordance with the laws, the non-teaching staff performs the complete administrative work of the College, offers all logistical support to the teaching process, and is ready for a successful realization of all future tasks of the Railway College.

Standard 12. Internal Quality Securing Mechanisms

A higher education institution works out and pursues a strategy to provide quality in its operation.

In its Book of regulations dealing with self-evaluation and assessment of study programs, teaching process and working conditions quality, the Railway College has defined a strategy and mechanisms for securing quality in its operation. The quality securing mechanisms have been defined by the following polls:

- the poll referring to the pedagogical qualities of teachers and associates,
- the questionnaire for the first-year students in 2006/2007,
- the poll among the employees of the College,
- the poll among the graduate students (referring to the possibility of getting a job, continuing education, etc.),
- the poll referring to the status of the College in the society (the College's market value).

The cooperation with the Employers' Association and the National Employment Exchange in connection with a permanent analysis of graduate students' effectiveness in different fields provides data for the Report on the results of the College's self-evaluation.

Standard 13. Openness in Activities

A higher education institution offers complete, precise, clear and available information about its activities which is intended for students, potential students and other persons who are interested in it.

The Railway College of Vocational Studies in Belgrade provides the students with the Information Booklet which is published when there are changes in the curriculum, as well as with the Students' Guide which is particularly intended for the students enrolling for the first year of their studies.

The College possesses its web-site: www.vzs.edu.yu and its e-mail address: office@vzs.edu.yu where the students can get all necessary information about the study programs, curriculum, and other information which are important for making progress during their studies.

3. STUDY PROGRAMS STANDARDS

Some of the most significant standards referring to study programs will be presented here, as well as the description of their realization at the College.

Standard 2. Purpose of a Study Program

A study program has a clearly defined purpose and role in the education system, available to the public.

The purpose of a study program is to enable everyone, without any exception, to develop his abilities and interests, through an educational system based on a permanent development of students' potentials. Acquiring knowledge, developing skills and assuming attitudes in the chosen field, the student gains a very justified and socially useful competence within his working process, which means that he accepts his own responsibility and has a constructive role in the society.

Students acquire their skills and knowledge through the realization of a study program during the three-year studies consisting of six semesters, in the course of the most modern teaching process applying audio-visual, interactive theoretical and practical teaching, with a variety of accompanying laboratory and demonstrative exercises, practical training within the activities of Serbian Railways, etc. The realization of this study program at the Railway College includes acquiring abilities and skills connected with a successful performance of jobs in the chosen field, in accordance with the world's experience and the practice of the International Union of Railways (UIC) in the field of railway transport.

The student is qualified to solve the following problems:

- how to contribute to a high-quality organization and realization of the working process of railway transport, and
- how to make the best use of his own potential, knowledge and skills.

Through its activities, a study program contributes to:

- meeting increasing demands of the Serbian Railways to train personnel in order to acquire new skills, knowledge and abilities in this field,
- further improving the curriculum (bringing the contents of organization and practical training up to date),
- striking a balance between academic general education, vocational and specialized education,
- providing conditions for introducing a certificate system and diploma and

qualification system in accordance with the European standards,

- achieving the quality of vocational education, while continually checking and evaluating the results of both the students and the teachers, as well as of the study program as a whole, and
- innovating equipment and teaching materials.

Standard 3. Aims of a Study Program

A study program has clearly defined aims.

The aims of a study program are to acquire general and vocational knowledge and skills in order that a person can enter a working process and perform vocational activities in the chosen field in a high-quality way.

The basic aim of a study program is to present the subject matter, applications, procedures and methodology in the chosen field in an adequate way. Such knowledge and practical skills are necessary for the Serbian Railways to carry out a variety of tasks in this field.

This study program tends to achieve the following aims:

- a coordination with the regulations of the Bologna process,
- a high degree of vertical and horizontal mobility of students,
- a great choice of study program subject matters (a great number of subjects to be chosen),
- a flexible organization of studies according to the wishes of each student (adaptation of study program subject matter to the student's affinities, but keeping the scope of vocational knowledge which is secured by study program nuclei),
- practical training at the technical-technological base of the Serbian Railways, etc.

On finishing the studies, the students gain competence to perform jobs from the chosen field, independently or in a team, which are important for a safe operation of railway transport.

The aims include a development of creative abilities of students, skills and knowledge suitable to perform concrete and reliable tasks, and, certainly, mastering specific practical skills necessary to practice this profession, while, at the

same time, keeping abreast of the innovations in their field and applying them.

Finally, the aim of a study program is that each student should be practically and theoretically qualified to become a good vocational engineer in the chosen field. Such an independent and team work of his is made possible thanks to an active teaching process and a variety of practical exercises which he attends during the studies, in addition to a practical training in the organizational units of the Serbian Railways, which has been defined by the Agreement on professional and technical cooperation between the Railway College and the Serbian Railways.

Standard 4: Graduate Students` Competence

Mastering a study program, the student acquires general and specific abilities which are necessary for a high-quality vocational, scientific and artistic work.

Mastering a study program in the chosen field, the student acquires necessary general and professional knowledge, particularly vocational and theoretical knowledge in a narrow field.

The teaching process is focused on the practical qualification to apply current regulations in the chosen field. An early contact with applying regulations in practice helps them to understand the aims of their own education, facilitates mastering theoretical knowledge, and strongly motivates students to invest time and work to carry out their duties. In other words, students are given an opportunity and pleasure to perform jobs they have chosen, so that they can gradually improve their knowledge and skills to a high professional level. In that way, students can demonstrate and apply their acquired knowledge. The result of the studies is performing and solving practical tasks in the chosen field independently or within a team.

The results of learning and education are as follows:

- the student is capable of acquiring a thorough knowledge and understanding of all the disciplines in his field,
- the student can solve any problems,
- the student is able to connect knowledge from different fields and to apply it in practice,

- in certain well chosen fields, the student is familiar with the practical side of vocational railway mechanical engineering,
- after the final examination, the student is able to keep abreast of the developments in the chosen field of railway transport, and to educate himself permanently during his working years, in accordance with the latest achievements in the field of railway mechanical engineering,
- the student is capable of using and applying the new European regulations and standards in railway mechanical engineering, and
- the student is interested in keeping abreast of the changes and innovations in his field.

Standard 5: Curriculum

The curriculum of a study program comprises the list and the structure of compulsory and optional subjects and modules, as well as their description.

The structure of a curriculum includes the list and the structure of compulsory and optional subjects and modules, as well as their description. It also includes the distribution of subjects and modules within semesters, the number of classes of active teaching, and the number of ECTS credits for each subject. The description of a subject comprises the name and type of the subject, the year and the semester of the studies, the number of ECTS credits, the name of the teacher, the aim of the course with expected results, knowledge and competence, prerequisites for attending classes, the subject matter, recommended literature, methods of attending classes, the way of checking knowledge and its evaluation.

The subjects are structured in such a way to enable improving concrete business processes in organizations, and the students master the presented subject matter from lectures and exercises through practical papers/reports which are prepared for each subject. They are qualified for team work in the fields within each study program.

The structure of individual subject groups distribution in study programs is shown in Table 1.

		Study programs				
		Railway mechanical engineering	Railway transport	Railway civil engineering	Electrical engineering in transport ¹	Railway commercial operation
Subject groups in relation to total ECTS number	Academic - general educational	12.82 %	13.16 %	12.82 %	13.64 %	13.51 %
	Vocational	43.59 %	42.10 %	43.59 %	40.91 %	43.24 %
	Vocation - applicable	43.59 %	44.74 %	43.59 %	45.45 %	43.24 %
	Optional	26.00 %	32.00 %	33.00 %	59.09 %	32.00 %

Table 1. The structure of individual subject groups distribution in study programs

Standard 8: Grading Students and their Progress

Grading students is done by a permanent surveillance of their work, and by the points acquired in fulfilling their pre-examination obligations and passing exams.

The success of a student in mastering a subject is permanently checked during the teaching process and is expressed in points. Fulfilling his pre-examination obligations and passing the final exam, the student can acquire 100 points at most.

All pre-examination obligations take a certain time necessary to be fulfilled and there is a deadline when they have to be completed. As the subjects are mutually different, the total number of 100 points is counted in different ways.

The evaluation elements are as follows:

Knowledge evaluation (maximum 100 points)				
Pre-examination obligations	Points		Final examination	Points
	Minimum	Maximum		
Activity during classes	7	15	Written examination	/
Practical training, exercises	5	10	Oral examination	30
Test(s)	2	5		
Colloquial exam(s)	-	-		
Home paper(s)	5	10		
Graphic paper(s)	5	15		
Seminar(s)	6	15		
Total points	30	70		

Table 2. Evaluation elements

1. *Regularity.* It refers to class attendance. The maximum number of points for class attendance is 15, and the minimum number is 7.
2. *Pre-examination obligations.* Points can be acquired by fulfilling all pre-examination obligations for a certain subject. The maximum number of points is 70, and the minimum number is 30.
3. *Taking exams.* The students who have acquired at least 30 points through their pre-examination obligations have the right to take an examination.

In Table 2, the example of an examination is given, with certain pre-examination obligations, which enable a permanent surveillance of a student's work.

¹ The electrical engineering in transport study group enables students to be educated in a broad spectrum of knowledge which is divided into three majors: telecommunications, signaling and safety equipment, and electrical energy. The majors are chosen by selecting individual vocation-applicable subjects which define them.

The permanent pre-examination grading of students should be a means of attaining the set aims regarding the efficiency, i.e. the quality of studying.

Table 3 shows the scale of grading students according to the number of acquired points.

Grade	Meaning of grade	Total number of points
10	Excellent - Exceptional	95 - 100
9	Excellent	85 - 94
8	Very good	75 - 84
7	Good	65 - 74
6	Satisfactory	55 - 64
5	Failed	Up to 54

Table 3. Evaluation scale (table)

4. CONCLUSION

Educational process will be put in accordance with European trends in order to attain more effective incorporation into European educational systems. In that way, students will be enabled to enter railway systems of Serbia and Europe more effectively. As a consequence, the Railway College of Vocational Studies will take its part in development of Serbian Railway and the region itself.

LITERATURE:

- [1] Higher Education Act (Serbia)
- [2] Report for the accreditation of the Railway College in Belgrade
- [3] Standards in higher education in Serbia
- [4] The Bologna declaration materials

БОЛОНСКИЯТ ПРОЦЕС ВЪВ ВИШЕТО ЖЕЛЕЗОПЪТНО УЧИЛИЩЕ В БЕЛГРАД

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Резюме: В този доклад се представя фундаменталният процес на преобразуване на Висшето железопътно училище в Железопътен колеж за професионални науки. Образователният процес ще бъде приведен в съответствие с европейските тенденции, за да се постигне по-ефективно вграждане в европейските образователни системи. По този начин студентите ще имат възможност да влизат в железопътните системи на Сърбия и Европа много по-ефективно. В резултат на това Железопътният колеж за професионални науки ще участва в развитието на Сръбските железници и на самия регион.

Ключови думи: Болонски процес, образователен процес, професионално обучение.