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## **MSC CURRICULUM DEVELOPMENT IN RAIL FREIGHT AND LOGISTICS: A LEVER TO ESTABLISH JOINT DEGREES**

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**Key words:** *joint MSc programs/degrees, curricula, mobility, collaboration.*

**Abstract:** *The paper presents four alternative curricula of MSc course in Rail Freight and Logistics developed within the RiFLE LLP/Erasmus project. They are discussed from the perspectives of students at the partner universities in Newcastle, Rome, Sofia and Ingolstadt. Each curriculum consists of a number of subjects so that a student can be granted 90 ECTS. The subjects identified are grouped by 6 key streams: Logistics; Technology and Management of Rail Transport; Rail and Logistics Infrastructure; Management and Marketing in Rail Freight and Logistics; Safety, Security and Risk Management; Transport Planning and Economics. The outcomes of the project and especially the curricula provide the necessary lever to establish and implement a possible joint degree programme in rail freight and logistics involving the universities of the participating countries in the future.*

### **INTRODUCTION**

The RiFLE project (Rail Freight and Logistics Curriculum Development) funded under the Erasmus Programme of the EC has been aimed to develop Master courses in Rail Freight and Logistics that will be delivered in English at the participating institutions as separate but shared programmes. The innovative idea is that these curricula should be compatible and allow students to do some modules at another partner's university.

To achieve the project goals, the RiFLE team mapped the existing rail, transport and logistics curricula, courses, programmes, training facilities and institutions in Europe and other regions. The information collected through a specially developed questionnaire was enriched with the data available from other similar examinations and analyzed to provide the necessary input for the subsequent work packages. Further, the consortium made a survey on the demands of business for staff training in rail freight and logistics outlining the gaps in visions of academic institutions and transport companies on theory-practice proportion in overall MSc training. The results were used to develop the Curriculum Framework involving both compulsory subjects and groups of optional ones to cover the entire scope of knowledge and skills necessary to manage complex supply chain transportation. The framework

developed gives a possibility to build curricula according to the needs of students with different backgrounds willing to specialize in rail freight and logistics.

## **CURRICULUM DEVELOPMENT**

The core activity within the RiFLE project was the development of MSc curricula based on the research on the existing university courses and staff demands of business in the transport sector. The responsibility to do that was assigned to the Newcastle University (UNEW), the project coordinator. To summarize the curriculum contents, the team members performed several tasks beginning with identifying and verification of all subjects that could be delivered throughout an MSc programme in rail freight and logistics.

The inventory was made using a special Subject Outline Form containing the following items: Title; Institution; Trainers and Contributors (if there is more than 1, the involvement of trainers and contributors is specified in percentage); Credits (EU or UK); Outline of Syllabus (short description); Modules in this Subject; Structure Teaching and Training Methods (lectures, guided individual studies, simulations, seminars and workshops, etc in hours). The subjects were classified in 6 key streams as follows:

1. Logistics;
2. Technology and Management of Rail Transport;
3. Rail and Logistics Infrastructure;
4. Management and Marketing in Rail Freight and Logistics;
5. Safety, Security and Risk Management;
6. Transport Planning and Economics.

Each stream includes several subjects but due to their specificity, “Rail Systems and Rail Skills” and “Major Rail Project” can fall within more than one of the key subject streams.

Of all 26 subjects, 10 are thought at the Newcastle University (UNEW), UK; 10 at the University of Transport (VTU), Bulgaria; 4 at the University of Roma “La Sapienza”, Italy and 2 at the University of Applied Sciences in Ingolstadt, Germany. The people responsible for the respective courses are identified personally. Technical visits are also considered within a long list of teaching methods to be utilized on the programme. The associated partners of the RiFLE project (i.e., MALCOLM Group, TruckTrain Developments Ltd., DB Schenker Rail BG, Porto Sines, etc.) play an important role for organization and fulfilment of such events.

In addition to the summary of subjects, the UNEW team produced a Guide for MSc Thesis presenting the necessary steps to launch, prepare, supervise, submit and defend the thesis. More specifically, this deliverable outlines the thesis structure and procedures to be followed within the programme in rail freight and logistics, thus being of great help to both students and supervisors and added-value to Academia and industry.

Besides the developments mentioned above, the most important outcome under the WP 6 “Rail Freight and Logistics Curriculum Development” is the creation of four alternative curricula. They are designed from the viewpoint of the participating universities, especially from student perspectives. Also, five mobility levels have been identified (Low Mobility Level; Between Low & Medium; Medium Mobility Level; Between Medium & High; High Mobility Level), which the students from different institutions of higher education are expected to experience. This is dictated by the available rail and logistics-related subjects offered to students in their home campuses.

The significance this deliverable is based on the fact that it provides the necessary lever to establish and implement a possible joint degree programme in Rail Freight and Logistics involving the participating institutions in the future. Although it has not been

included in the project aims, it will be a certain contribution to the European Area of Higher Education.

**Curriculum 1: From a Newcastle Student Perspective**

Title	Stream	Credits in
1 Freight Transport Logistics	L	5
2 Railway Vehicles	TMRT	5
3 Rail Environment and Energy	TMRT	5
4 Rail infrastructure	RLI	5
5 Rail Freight Operations and Management	MMRFL	5
6 Rail Safety and Security	SSRM	5
7 Multimodal Transport Policy and Practice	TPE	5
8 Rail Planning & Timetabling	TPE	5
9 Rail Systems and Rail Skills	All St.	10
10 Major Rail Project	All St.	40
<b>Total Credits</b>		<b>90</b>
<b>Missing Credits</b>		<b>0</b>
<b>Mobility Level</b>		<b>Low</b>

**Curriculum 2: From a Rome Student Perspective**

Title	Stream	Credits in
1 Rail Transport	TMRT	9
2 Goods Transport and Logistics	MMRFL	6
3 Safety of Transport	SSRM	6
4 Transport Techniques and Economics	TPE	6
-	L	0
-	RLI	0
-	All St.	0
<b>Total Credits</b>		<b>27</b>
<b>Missing Credits</b>		<b>63</b>
<b>Mobility Level</b>		<b>Medium / High</b>

**Curriculum 3: From a Sofia Student Perspective**

Title	Stream	Credits in
1 Fundamentals of Logistics	L	5
2 Operations Research in Logistics and Transport	L	7
3 Design and Management of Logistic Chains	L	6
4 Management and Marketing Logistics and Transport	L	6
5 Technical Operation and Safety of Transport	SSRM	6
6 Technology and Organisation of Transport	TPE	5
7 Financial Engineering and Project Management	TPE	6
8 Commercial Operations	TPE	6
9 Fundamentals of Accounting	TPE	6
10 Traffic Forecast	TPE	6
	TMRT	0
	RLI	0
	All St.	0
<b>Total Credits</b>		<b>59</b>
<b>Missing Credits</b>		<b>31</b>
<b>Mobility Level</b>		<b>Low / Medium</b>

**Curriculum 4: From an Ingolstadt Student Perspective**

Title	Stream	Credits in
1 Fundamentals of Logistics and Production Planning	L	5
2 International Supply Chain Management	L	5
	TPE	0
	MMRFL	0
	SSRM	0
	TMRT	0
	RLI	0
	All St.	0
<b>Total Credits</b>		<b>10</b>
<b>Missing Credits</b>		<b>80</b>
<b>Mobility Level</b>		<b>High</b>

## CURRICULUM VALIDATION AND EXPLOITATION OF RESULTS

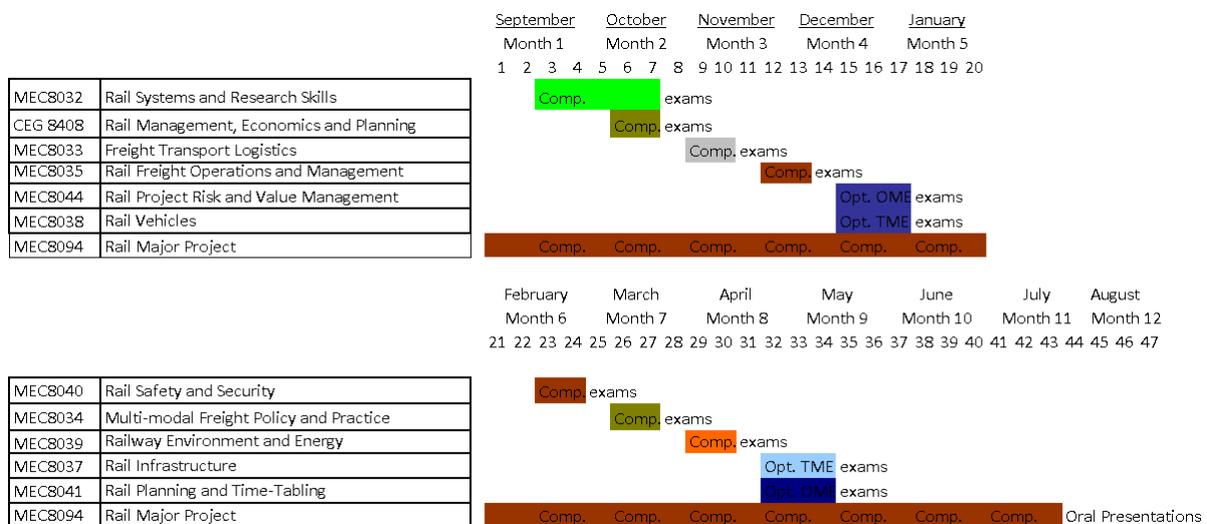
The validation work conducted within the project was performed in compliance with the stepwise methodology developed especially for that purpose and employing multi-method approach and road-mapping in combination with systems approach. The curricula were validated against the European Educational Standards for Master programmes during the workshop held in Rome on 28 September 2012 and attended by some associated partners and other stakeholders. However, those who are interested in the new MSc courses are much more than the participants in this event and involve representatives of both academic institutions and business in Europe and the world.

For the project success it is also substantial to provide effective exploitation and implementation activities. Within RiFLE they are focused to:

- 1) Involvement of industry for ensuring collaborative learning process;

- 2) Exploring innovative learning means, such as: Distance "open"/E-/Blended learning and their implementation for the RIFLE purposes;
- 3) Implementation of the curricula themselves into practice, which will require mobility patterns of staff and students to be identified;
- 4) Exploration of possibilities for establishing a joint degree MSc programme in rail freight and logistics in the future, its means and sustainability over time.

Evaluating the overall project results, it should be emphasized that the Newcastle University opens an MSc in Rail Freight and Logistics announced to begin in September 2013. The objective of the programme: “to develop the student's ability to initiate and carry out advanced performance systems analysis and research projects to solve managerial and engineering-related problems in rail freight and logistics” is advertised in Chinese, French, Portuguese, Russian, Spanish presenting the curriculum to a broader area of potential applicants.



**Fig.1 MSc in Rail Freight and Logistics at the Newcastle University**

Another achievement within the project is that the consortium members started the discussion on possible joint degrees during the meeting in Sofia on 21-22 March 2013 where a number of scenarios were presented. The initial idea was to involve all partners or at least three of them (those having traditions in teaching subjects in the field of rail transport and logistics: Newcastle University, University of Transport and University of Roma “La Sapienza”) but the survey on the national practices proved that it would be better to establish bilateral cooperation and further develop a trilateral joint degree.

Despite the availability of curricula as a lever to begin negotiations on joint degrees, there are a lot of organizational and financial problems to be solved. Clarification is needed for many issues such as Admission and Entry requirements; Tuition Fees; Studies and Mobility Patterns; Examination Process; Graduations; Legal framework; identification of the Compulsory and Optional modules that should not overlap; Independent e-Platform to be built; Final Examination (Major Project), etc.

## CONCLUSIONS

The most important outcome of the RiFLE project is that it has fostered the process of establishing joint degrees in Rail Freight and Logistics. The partners have already declared

their intention to promote such a strategy, which will be confirmed by signing Memorandum of Agreement.

Although the UNEW vision is that both models, as discussed in Sofia, would work, the beginning will be set by joint degrees established with and University “La Sapienza” and VTU individually (in the academic year 2014-2015). Then the partners could think of an MSc programme involving the three institutions as a further step in cooperation of the project partners.

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# РАЗРАБОТВАНЕ НА УЧЕБНИ ПЛАНОВЕ ЗА МАГИСТРАТУРА ПО ТОВАРНИ ЖЕЛЕЗОПЪТНИ ПРЕВОЗИ И ЛОГИСТИКА – ЛОСТ ЗА СЪЗДАВАНЕ НА СЪВМЕСТНИ СТЕПЕНИ

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**Ключови думи:** съвместни магистърски програми/степенни, учебни планове, мобилност, сътрудничество.

**Резюме:** Докладът представя четирите алтернативни програми на магистърски курс по товарни железопътни превози и логистика, разработени в рамките на проекта RiFLE по програма „Учене през целия живот/Еразъм”. Те са разгледани от гледна точка на студентите в университетите партньори в Нюкасъл, Рим, София и Инголицат. Всяка програма се състои от няколко теми, така че на един студент може да бъде предоставена възможност за получаване 90 кредита по ЕСНТК. Включените учебни дисциплини са групирани в 6 ключови направления: логистика; технологии и управление на железопътния транспорт; железопътен транспорт и логистична инфраструктура; мениджмънт и маркетинг в железопътните товарни превози, логистика; безопасност, сигурност и управление на риска; транспортно планиране и икономика. Резултатите от проекта и особено учебните програми осигуряват необходимия лост за разработване и прилагане на съвместни програми/степенни по железопътни товарни превози и логистика в бъдеще с участието на партньорските университети от участващите страни.