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Summary of

BACHELOR LEVEL MODULE DESCRIPTIONS

Interreg Central Baltic
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EXECUTIVE SUMMARY

This document comprises a short description of each of the 18 bachelor level modules, and serves as a dissemination activity for informing teachers about the different modules. For teachers that are interested in re-using these modules, the deliverable provides contact details of the project manager who will assist in further access to the curricula as well as to learning materials (depending on IPR issues etc.)
The deliverable is a summary of the information available in D3.2.2.

Background

Due to the changing business and working environment (digitalization, tailoring and ever-growing customer requirements, re-engineered processes, and new business models), also the logistics discipline has changed and grown over the recent decades. As the world is changing, the companies must change and develop simultaneously as well to maintain and improve their competitiveness. This change of operating environment has also meant changes in knowledge, skills, and competences needed in different logistics functions, in different industries along the SC - not only in transportation and warehousing, but also in SC planning and management, material handling etc. According to the Logistics Performance Index by the World Bank, all CB area countries have improvement needs in their logistics skills and competences; some countries being already somewhat more advanced, some demanding significant skill and competence improvement/updating actions. The need to develop the skills and competences, however, is common for all CB countries. All countries are facing a lack of skilled and competent workforce in all level logistics duties, ranging from operative tasks to management duties. The level of existing logistics skills and competences, on the other hand, is in direct relation with the level and contents of logistics education being offered. As the markets are changing, the logistics education must change simultaneously. There is thus a common CB wide challenge to make the logistics education to match the needs of the changing markets and consequently to make the whole area more competitive and successful in the global competition.

Structure of the document

Body of this document is structured by the main cross-sectoral and cross-professional areas, which have been identified as the ones most requiring increase of competences across the whole CB area-new technologies, holistic understanding of logistics and managerial skills.

1. NEW TECHNOLOGIES

This section describes six different modules on technology usage within logistics. They are combinable, but that would require some restructure of the number of assignments. Each module is calculated to be 1 ECTS.

Foundation of Industry 4.0 and CPS in Logistics

This module gives a basic introduction to the technical foundation of industry 4.0 and CPS. It also gives some examples on how CPS, IoT and Industry4.0 applications can look like in logistics. The module uses a digital twin for investigating different technologies.
The ILOs:

- Understand the system architecture
- Know the different components in a CPS system
- Get an overview of how it can be used in logistics
- Know about main barriers for implementation
- Know about frameworks for standardization

Transportation Means and Technologies

This module is about Transport means and units. Types of trucks and other commercial vehicles. Road transport technologies. Road transport terminals. Road infrastructure. Locomotive types. Cargo wagon types. Railroads. Rail transport infrastructure. Rail transport terminals. Ships and vessels. Inland water transport barges. Types of barges. Types of cargo ships. Ports and port technologies. Port terminals. Aircrafts. Types of cargo aircrafts. Airports. Air cargo terminals. Aerodrome cargo trucks and other handling equipment. Unit load device. Types of unit load device.

Sustainable and Intelligent Transport Systems

The study course provides an overview of sustainable and intelligent transport systems, their evolution over time and possible future developments.
The study course presents: history of transportation systems, sustainable transportation systems, climate change, global warming, air quality in cities, resources of fossil fuels, road traffic safety, total cost of transportation, speed and fuel consumption. Speed and environment pollution. Speed and road accidents, alternative fuels, green transportation modes, green transportation corridors, definition of intelligent transportation systems (ITS), achievements in the area of ITS, ITS characteristics, ITS technologies, ITS implementation areas, ITS and sustainable transportation, geographical information systems, satellite navigation systems, global positioning systems, intelligent infrastructure, intelligent vehicle,

intelligent shipment. Information change between the vehicles, telematics and road transport.

Basics of Logistics Information and Communication Systems

The module focuses on logistics information systems, information system structure, terminology and main concepts. The module helps students to understand information systems modelling, software life cycle, selection criteria and principles.

E-Services and Logistics Digitalisation

The module focuses on trends of logistics digitalisation, terminology and main co ncepts, E- services and data exchange models and standards, user rights and au horization, digital transport documents.

Transportation Management System

This module presents an overview and introduction to use TMSs in Business. Topic of concerns are:

- TMS- concept and objectives
- Benefits of TMS (technological capabilities, simplify processes, track freight, business insights)
- Types of TMS
- TMS challenges
- TMS role in SC management
- Freight management system

2. HOLISTIC UNDERSTUNDING OF LOGISTICS

This section comprises nine modules à one ECTS, i.e. approximately 25-30h work for the students.

2.1. Customer Value Creation in Supply Chain

The module focuses on conceptual framework of the customer value and value chain from a business management perspective. The topic is examined utilizing Michael Porter's (1985) value chain model. Particular attention is paid to value creation within each step/activity (inbound, in-house, outbound, marketing & sales, services, as well as procurement) of SC process, and achieving competitive advantage through value maximization.

The module helps student a) to perceive SC from holistic perspective, presenting all the steps required to get the product to the customer, b) to understand SC management as process, which aims at creating and increasing overall value and customer satisfaction, and c) to see SC process as value creation process, and source of competitive advantage.

2.2. Logistics Improvement Methods and Tools

The module works as an introduction to the most common methods and tools for logistics and SC process improvement, and their application. The module is implemented as a study where students get acquainted with tools/techniques/processes for efficient logistics operations reflecting the latest innovation in technologies and processes. Later the student focuses more profoundly on few selected methods/tools in a case study (researching on selected methods/tools, creating introductory toolcard with an exemplary case on the use of the tool, and presenting the toolcard).

The module helps student to find information about SC/logistics process improvement tools and methods, and to analyze and select the right kind of improvement tool/method for the problem at hand. By the end of the module student is familiar with most common methods and tools for logistics and SC, and knows the principles of applying them for logistics / supply chain improvement.

2.3. Future Trends of Supply Chain

The module focuses future trends of SC, including the analysis of the global megatrends, introduction of new technologies and the influence of sustainable thinking on SCs.
The module helps student to recognize future trends and issues affecting the field of SC management, as well as help the participant to recognize the future skills and competences needed for individual career development.

2.4. E-Commerce Changing Last Mile

The module focuses on the opportunities of e-commerce, and current and future last mile delivery solutions. The course concentrates to analyse and gain further understanding on distribution channels, different distribution strategies as well as practices and innovations to enhance last mile deliveries.

2.5. Supply Chain Risk Management

As stream of new initiatives and methods for more efficient SCs have been introduced, the more vulnerable the SCs have become for disruptions. This has meant also the growth in impact of risk management on the SC. This module will focus on principles of SCRM, different approaches for identifying, evaluating, treating, and monitoring SC risks, and SCRM methods most widely used in practice. The module will pay closer attention to supplier risk in global sourcing.

During the module the student learns to:

- identify internal and external environments from perspective of SCRM
- identify, analyze and evaluate risk
- identify, analyze and evaluate risk treatment methods and tools
- monitor and review the risk management process

The module helps student to understand the significance of risk management for today's business life, for responding to changes in the internal and external business environment, as well as for improving and maintaining SC performance for increased value creation.

2.6. Challenges of Rail Transport in Baltic Sea Region

This module is on Railway transport logistics practicality, length of transportation cycle, simplex method, designing of data base, electronic map of Riga railway network, currency exchange for transportation payment, position of transport task. The study course: provides students with instruction in the critical concepts and planning of railway operations and to the processes used for managing railway operations. The key planning tasks of railroad professionals are stressed. Equal emphasis is placed on the increasing reliance on intermodal (multi-modal) freight transportation and the re-emergence of rail passenger, commuter, and transit system, and their roles.

2.7. Road Freight Transportation: CMR Convention, ITE 322

This module is developed by RTU. During the course students learn legal relationships of international road transportation regulations. The study course presents and explains the practical application and analysis of legal organization of transport services, regulatory documents for international shipments, world and European organizations governing the shipment of goods, also the subject deals with road transport law, international transport conventions.

The ILOs are: To understand freight transportation process, to communicate with parties involved in process of logistics, observing requirements included in CMR legal document. To develop capabilities to take decisions and to act in non-standard situations within own competence. The goal of the study course is to provide theoretical and practical knowledge of international and national transport law and regulatory documents. Through practical team and individual work, to develop students' ability to understand and apply documents and organizations that govern national and international shipment of goods, to understand the nature and mechanisms of action of international shipping conventions, to be able to compare them with the national transport regulatory documents. Students will be able to classify international and national transport regulatory documents. Students will know organizations governing the shipment of goods.

2.8. Road Freight Transportation: Access to Transportation Market

This module is on freight road transportation and its basic organizational principles and understand access to transportation market. The study course presents: overview of the modes of transportation, the specific economic, organizational and planning aspects. Relevance of the state regulation concerning different modes of transportation. International agreements. Costs and tariffs, organization of transportation from the transport user, third party and carrier's perspectives. Prospects of development of the transport network. Subject matter and significance of international economic relations, foreign trade, investments and joint ventures; Commodities and services in the world market. International settlements, crediting

2.9. Reverse Logistics

This module comprises topics like :Reverse logistics definition, meaning and importance for today`s SC management. Reverse logistics' activities: Managing

the returns, Remanufacture, Managing the reverse logistics supply chain. Closed loop supply chains. Disposition and the secondary market.

3. MANAGERIAL SKILLS

The analysis of future competence needs showed that there is a need for managerial skills at this level, but that the overall offer is quite good. Consequently, we have developed three different modules within this area.

Concepts of Continuous Process Improvement

The module focuses on conceptual framework of continuous process improvement and its significance for business making, overall value creation, and SC process efficiency. The topic is examined from business management and SC management perspectives utilizing Deming's PDSA-cycle (plan-do-study-act).

During the module the student learns to:

- identify SC process/problem, collecting data, and developing an improvement plan based on this data;
- implement the plan, observing the plan, collecting data for evaluating of the plan;
- analyze the collected data of the previous steps, and assessing the improvement of the process/problem; and
- analyze the results, revising and repeating the cycle based on the results.

The module helps student to understand the principles of continuous process improvement and its significant for today's business life, for responding to changes in the internal and external business environment, as well as for improving and maintaining SC performance for increased value creation.

3.1. Lean Management

The objective of this course is to introduce the principle of Lean philosophy and the most common Lean tools for continuous improvement of efficiency, productivity and customer value.

I. To understand the difference of resource efficiency and flow efficiency i.e. how Lean thinking changes the focus of management from optimizing separate resources to optimizing the flow of products and services through entire value streams to customers.

II. Getting knowledge of some main Lean tools e.g. VSM, Kaizen, Just in Time, SMED, Poke Yoke, Jidoka, Heijunka, Gemba and Kanban.

III. To understand what is Lean and its 5 main principles:

1. Define the Value from Customer point of view

2. Map the Value Stream by VSM tool and remove identified waste
3. Create flow
4. Establish pull
5. Aim for perfection: making lean thinking and process improvement part of your corporate culture

Enterprise Resource Planning

The module focuses on explaining the principles of an integrated ERP system through a detailed case study of sales and distribution process using SAP ERP system. The module fosters a thorough understanding of each SD-process step and underlying SAP ERP functionality. Through practical exercises, the student becomes aware of and is able to perform an integrated order-to-cash cycle. Through different roles taken in the case study (e.g. sales agent, warehouse worker, and accounting clerk) the order-to-cash process will foster understanding of the entire SC management process and his / her role in the supply chain.

Interested in re-using some of the modules?

Contact project Manager

Jannicke Baalsrud Hauge

KTH-Royal Institute of Technology

jmbh@kth.se