

National Research University - Higher School of Economics

Faculty of World Economy and International Affairs

Course Syllabus and Description

International Operational and Supply Chain Management

Master of International Business Program

38.04.02 Management

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Moscow 2016

International Operational and Supply Chain Management

COURSE DESCRIPTION

Pre-requisites:

International Relations

World Economy

Foundations of Managerial Economics

Principles of Accounting

Course type: elective

Abstract: The course syllabus sets minimal requirements for student's knowledge and skills and determines the content and forms of study and performance evaluation.

The course syllabus is designed and suitable for faculty teaching this course, teaching assistants and students studying at the Master's program "International Operational and Supply Chain Management", Degree code 38.04.02 "Management".

The syllabus is developed according to:

- the standard educational requirements of «National Research University «Higher School of Economics» (HSE) for the Degree code 38.04.02 in Management;
- the Master of International Business program curriculum.

LEARNING OBJECTIVES

- To provide students with the basic understanding of contemporary supply chain organization on local and international levels
- To introduce students to existing operational management practices and supply chain strategies
- To train students to identify operations optimization opportunities within one or multiple supply chains
- To support students in development of practical operational management solutions targeted on supply chain optimization
- To develop modelling and analysis tools and approaches to be implemented further on by students in their practical managerial activities

The goal of this course is to facilitate the development of skills and a knowledge base that will enhance student's ability to more effectively understand, interpret and engage in managerial activities over supply chain and operational management with consideration of international environment and focus on practical results of their decisions.

The students will investigate, understand and analyze the processes behind the efficient supply chain strategy development and implementation. To familiarize themselves with the process,

the students will be engaged in practical modelling tasks in the following areas: stock management, warehouse layout and operations planning, transport scheduling and routing, operational processes description, inter-company and international cooperation within the supply chains.

During the course students will define an enterprise to model and following the course topics, will perform practical tasks in a setting of the enterprise. Decisions they take on different steps will define the basis for their future managerial tasks, so they would better understand the integrity of managerial process within operational and supply chain activities.

LEARNING OUTCOMES

As a result of the course, the student should have:

- Knowledge: of main theories, concept and approaches in modern supply chain and operational management;
- Awareness: mechanisms and principles of supply chain functioning on local and international levels; operational management practices;
- Ability: to develop operational management solutions for specific tasks; to define supply chain strategy for the specific enterprise; to model supply chain and operational process and predict their outcomes;
- Skills: operational instructions preparation; stock management.

As a result of the course, the student should possess the following competences:

General (Common) Competences

Competence	Descriptors – main features of learning (achievement criteria)	Forms and methods of study. Evaluation methodology
Ability to analyze supply chain organization of defined company and reveal optimization mechanisms which can be developed and implemented.	Able to use theoretical knowledge and practical experience to identify core requirements for organization's supply chain to be efficient. Able to reveal bottlenecks in current processes and offer solutions to improve the overall efficiency based on theoretical knowledge and detailed analysis applied to exact practical situation.	Lectures Discussions Individual and group projects preparation
Ability to generate new ideas and evaluate opportunities, creativity and leadership	Able to identify feasible ideas, provide evidences in their support, articulate thoughts and speak in public on professional topics and development of credible models \ providing technical descriptions of proposed solutions.	Group discussions and projects

Special (Subject-oriented) Competences

Competence	Descriptors – main features of learning (achievement criteria)	Forms and methods of study. Evaluation methodology
Ability to perform root causes analysis in supply chain efficiency related areas.	Able to identify factors and their weight\ effects on overall supply chain efficiency. Able to create operations model, that predicts the outcome of managerial decisions taken and surrounding environment changes.	Group discussions Individual and group projects preparation Analysis of other teams proposals
Ability to support strategic decisions with specific operations management activities in order to implement desired strategy in practice.	Ability to develop and describe the operating procedures supporting shop-floor processes and suitable for employees training, execution control and assurance of overall efficiency of the process	Discussions Individual and group projects preparation

COURSE PLAN

Supply chain management becomes increasingly important activity in modern economy, where efficient production and commercial activity requires specialization and exploitation of advantages of individual entities and locations to get a competitive edge on a global markets. Thus, modern supply chains even for the most generic goods consist of multiple nodes and involve many counterparts engaged in constant collaboration process.

Success of the enterprise in such environment depends not only from efficient strategy development or supply chain design and planning, but as well on the operational level, where execution and implementation will define the final result and economical outcome of every activity.

Students will be exposed to the concepts of modern supply chain and operational management in a form of lectures and joint discussions of given cases and examples. Major part of the course will be dedicated to critical assessment of given situations, modelling of own supply chain decisions and their outcomes in given environment and development of practical tools, supporting supply chain and operational management activities.

The course will give the students solid understanding of supply chain and operational management topics organization encounter in their daily business activities. After successfully passing the course, students should be able to:

- define optimal supply chain setup in variety of surrounding environmental conditions
- identify optimal logistics flows for selected supply conditions
- develop warehousing solutions to support specific logistics flows
- manage the creation and maintenance of operational information systems
- assess the efficiency and reveal bottlenecks in existing supply chain and operational decisions
- define, validate and describe operational instructions

The focus of this course would be the development of practical skills and knowledge, required to deal with concrete tasks in supply chain and operational management area and to be able to solve practical tasks in modern economic environment.

Students will be organized in teams of 3-4 people to work jointly on practical assignments. Each team will develop its' own supply chain solution for an organization or a problem selected by team members at the beginning of the course including:

- Motivated selection of logistics flow
- Design of a supply chain solution
- Creation of SOP or other appropriate description for selected procedure
- Design of KPI matrix and performance monitoring system

and other topics

Each completed task should be distributed to other team, which would provide critical and motivated insight on solutions, proposed by original authors. Selected tasks and analysis results will be discussed jointly by all students during seminars to elaborate common discussion over most complicated and interesting topics and examples.

During the course, each team will make two presentations on selected topics to describe and defend their proposals in front of the students board.

Final assignment would be to harmonize previous individual tasks and to provide end-to-end solution for a problem.

The course consist of two parts. The first part covers supply chain and logistics topics, giving students insights about existing practices and theory of supply chain activities, role of supply chain function in modern economy and activities connected with the supply chain area. In practical area, this part of the course will be more focused on analysis and decision-making process with modelling and risk-management activities involved.

The second part is dedicated for operational management practices and mechanics of managerial decision implementation on shop-floor level. Major focus in this part will be done on practical individual and group tasks as well as concrete examples analysis, to understand the execution and implementation mechanisms which should follow the managerial decisions.

As operational management is an integral part of supply chain management activities, both parts will overlap within the course and both will be encountered in different proportions in majority of topics.

The course is taught at the Master of International Business, in module 1/2 of the second year of studies. The course is equivalent to 4 credits and 48 contact hours.

The group will meet once a week for 4 academic hours – 2 hours of lectures and 2 hours of instructions and seminars.

№	Topic	Hours total	Contact Hours			Homework
			Lectures	Seminars	Total	
1	Supply chain organization and logistics flows	16	4	4	8	8
2	Stock management	28	2	6	8	20

3	Warehousing and transport logistics solutions	22	2	4	6	16
4	Standard operational procedures	12	2	2	4	8
5	Productivity analysis and operational KPIs	16	2	2	4	12
6	Added value services and 3 rd parties integration in supply chains	18	2	4	6	12
7	Supplier-customer collaboration	12	2	2	4	8
8	Integral supply chain solutions development and implementation	28	2	6	8	20
Overall total:		152	18	30	48	104

COURSE TOPICS DESCRIPTION AND READING LIST

1. Supply chain organization and logistics flows

Differentiation between Supply chain and traditional logistics. Role of Supply chain function in organization. Vertically integrated and international supply chains. Supply chain nodes connectivity. Multi-modal logistics and supply chains.

Logistic flows: central stock and cross-docking. Break-bulk cross-docking. Role and function of specific logistic flow in a supply chain. Optimal selection of logistics flow depending on supply chain.

Recommended readings (compulsory):

1. Tang, S. L., & Yan, H. (2010). Pre-distribution vs. post-distribution for cross-docking with transhipments. *Omega*, 38(3), 192-202.
2. Van Belle, J., Valckenaers, P., & Cattrysse, D. (2012). Cross-docking: State of the art. *Omega*, 40(6), 827-846.

Recommended readings (additional):

1. Agustina, D., Lee, C. K. M., & Piplani, R. (2010). A Review: Mathematical Models for Cross Docking Planning. *International Journal of Engineering Business Management*, 2(2), 47-54.
2. Apte, U. M., & Viswanathan, S. (2000). Effective cross docking for improving distribution efficiencies. *International Journal of Logistics*, 3(3), 291-302.
3. Fernie, J., & Sparks, L. (Eds.). (2004). *Logistics and retail management: insights into current practice and trends from leading experts*. Buy now from Kogan Page.
4. Li, X., & Wang, Q. (2007). Coordination mechanisms of supply chain systems. *European journal of operational research*, 179(1), 1-16.
5. Li, Z., Low, M. Y. H., Lim, Y. G., & Ma, B. (2008, July). Optimal decision-making on product ranking for crossdocking/warehousing operations. In *Industrial Informatics, 2008. INDIN 2008. 6th IEEE International Conference on*(pp. 871-876). IEEE.
6. Vis, I. F., & Roodbergen, K. J. (2008). Positioning of goods in a cross-docking environment. *Computers & Industrial Engineering*, 54(3), 677-689.

7. Vorst, J. G. A. J., Beulens, A. J., Wit, W. D., & Beek, P. V. (1998). Supply chain management in food chains: improving performance by reducing uncertainty. *International Transactions in Operational Research*, 5(6), 487-499.
8. Waller, M. A., Cassady, C. R., & Ozment, J. (2006). Impact of cross-docking on inventory in a decentralized retail supply chain. *Transportation Research Part E: Logistics and Transportation Review*, 42(5), 359-382.
9. Wong, C. Y., Arlbjørn, J. S., & Johansen, J. (2005). Supply chain management practices in toy supply chains. *Supply Chain Management: An International Journal*, 10(5), 367-378.
10. Zairi, M. (1998). Best practice in supply chain management: the experience of the retail sector. *European Journal of Innovation Management*, 1(2), 59-66.

2. Stock management

Modern stock management concepts. Role of stock management strategy for the organization. Just-in-time stock management policies. Risks and opportunities connected with stock management strategy. Automated stock management and stock replenishment systems. Stock behavior in supply chains. Bullwhip effect and imperfect supply environments. Stock management and supply\demand forecasting within the organization. Stock management in international environment & supply chain internationalization risks for efficient stock management.

Recommended readings (compulsory):

1. Disney, S. M., Farasyn, I., Lambrecht, M., Towill, D. R., & de Velde, W. V. (2006). Taming the bullwhip effect whilst watching customer service in a single supply chain echelon. *European Journal of Operational Research*, 173(1), 151-172.
2. Wright, D., & Yuan, X. (2008). Mitigating the bullwhip effect by ordering policies and forecasting methods. *International Journal of Production Economics*, 113(2), 587-597.
3. Nahmias, S., & Smith, S. A. (1994). Optimizing inventory levels in a two-echelon retailer system with partial lost sales. *Management Science*, 40(5), 582-596.

Recommended readings (additional):

1. Beutel, A. L., & Minner, S. (2012). Safety stock planning under causal demand forecasting. *International Journal of Production Economics*, 140(2), 637-645.
2. Carlsson, C., & Fullér, R. (2001, January). Reducing the bullwhip effect by means of intelligent, soft computing methods. In *System Sciences, 2001. Proceedings of the 34th Annual Hawaii International Conference on* (pp. 10-pp). IEEE.
3. Chandra, C., & Grabis, J. (2005). Application of multi-steps forecasting for restraining the bullwhip effect and improving inventory performance under autoregressive demand. *European Journal of operational research*, 166(2), 337-350.
4. Cheung, K. L., & Lee, H. L. (2002). The inventory benefit of shipment coordination and stock rebalancing in a supply chain. *Management Science*, 48(2), 300-306.
5. Hochmuth, C. A., & Köchel, P. (2012). How to order and transship in multi-location inventory systems: The simulation optimization approach. *International Journal of Production Economics*, 140(2), 646-654.
6. Inderfurth, K., & Minner, S. (1998). Safety stocks in multi-stage inventory systems under different service measures. *European Journal of Operational Research*, 106(1), 57-73.
7. Kalchschmidt, M. (2012). Best practices in demand forecasting: Tests of universalistic, contingency and configurational theories. *International Journal of Production Economics*, 140(2), 782-793.

8. Nienhaus, J., Ziegenbein, A., & Schoensleben, P. (2006). How human behaviour amplifies the bullwhip effect. A study based on the beer distribution game online. *Production Planning & Control*, 17(6), 547-557.

3. Warehousing and transport logistics solutions

Deep insight into modern warehousing solutions. Standard warehouse building practices. Real estate market in logistics. Warehouse operational layout design. Build-to-suit practices in modern warehousing. Racking and storage solutions. Warehouse equipment and automation. Warehouse IT infrastructure. Planning warehouse layout and resources based on selected logistics flow.

Organization of Transport management function within the organization. Modern transport management systems. International and multi-modal transportation. Role of regulations and limitations in transport.

Logistics service providers (3PL and 4PL) and their role in modern supply chains. Linking warehouse and transport solutions with supply chain goals and strategy.

Recommended readings:

1. Yu, W., & Egbelu, P. J. (2008). Scheduling of inbound and outbound trucks in cross docking systems with temporary storage. *European Journal of Operational Research*, 184(1), 377-396.
2. Agustina, D., Lee, C. K. M., & Piplani, R. (2014). Vehicle scheduling and routing at a cross docking center for food supply chains. *International Journal of Production Economics*.
3. Cardos, M., & García-Sabater, J. P. (2006). Designing a consumer products retail chain inventory replenishment policy with the consideration of transportation costs. *International Journal of Production Economics*, 104(2), 525-535.
4. Chen, P., Guo, Y., Lim, A., & Rodrigues, B. (2006). Multiple crossdocks with inventory and time windows. *Computers & Operations Research*, 33(1), 43-63.
5. Lee, Y. H., Jung, J. W., & Lee, K. M. (2006). Vehicle routing scheduling for cross-docking in the supply chain. *Computers & Industrial Engineering*, 51(2), 247-256.

4. Standard operational procedures

Role of Standard operational procedure in supply chain operations and operational management. Adoption standard operational procedure for shop-floor. Training for shop-floor personnel. Revision and validation of procedures. Informational system for operational management. Complex risk management systems and operational standards (i.e. HACCP quality management standard).

5. Productivity analysis and operational KPIs

Supply chain and operational management key performance indicators. Supply chain scorecards in inter-company communication. Shared KPI systems in modern supply chains.

Definition of operational KPIs for efficient supply chain organization. Conflict of interest between supply chain actors. Balancing operational KPIs. Usage of KPI system for personnel motivation and bonus schemes. KPI monitoring function in organizations. Reporting system

creation. Tracking KPIs through warehouse management systems. Taking managerial decisions based on reporting and KPI data.

6. Added value services and 3rd parties integration in supply chains

Added value services in supply chains. Selection of optimal nodes for added value services. Copacking and labelling as a basic examples of added value service. Added value service importance for internationalized supply chains.

Outsourcing in modern supply chains and operational management. Common practices of activities outsourcing. Outsourcing of services. Outsourcing of core operations. Risks and opportunities of outsourcing. Efficient control over outsourced activities. Integration of outsourced activities into managerial and operational procedures.

7. Supplier-customer collaboration

Building efficient supplier-customer collaboration within supply chains. Exploitation vs. collaboration. Building long-term supply chain collaboration with counterparts. Synergies of collaboration between different supply chain nodes. Joint stock planning and vendor managed inventory practices. Counterparts as supply chain service providers. Supply chain management by dominant market supplier. International collaboration within the supply chain.

1. Barlas, Y., & Gunduz, B. (2011). Demand forecasting and sharing strategies to reduce fluctuations and the bullwhip effect in supply chains. *Journal of the Operational Research Society*, 62(3), 458-473.
2. Kanda, A., & Deshmukh, S. G. (2008). Supply chain coordination: perspectives, empirical studies and research directions. *International journal of production Economics*, 115(2), 316-335.
3. Disney, S. M., & Towill, D. R. (2003). The effect of vendor managed inventory (VMI) dynamics on the Bullwhip Effect in supply chains. *International journal of production economics*, 85(2), 199-215.
4. Holmström, J. (1998). Business process innovation in the supply chain—a case study of implementing vendor managed inventory. *European Journal of Purchasing & Supply Management*, 4(2), 127-131
5. Kulp, S. C., Lee, H. L., & Ofek, E. (2004). Manufacturer benefits from information integration with retail customers. *Management science*, 50(4), 431-444.
6. Waller, M., Johnson, M. E., & Davis, T. (1999). Vendor-managed inventory in the retail supply chain. *Journal of business logistics*, 20, 183-204.

8. Integral supply chain solutions development and implementation

Designing balanced supply chain solution. Decision trees modeling and measures total effect estimation throughout supply chain. Design feasibility and integrity checks. Supply chain solution implementation aspects in national and international environment.

GUIDELINES FOR KNOWLEDGE ASSESSMENT

The class will meet once a week for 4 hours. Typically, there will be lectures and discussions of the material covered in the corresponding section. Attendance and participation in the classes are required. In case attendance is not possible, tasks can be submitted by e-mail or

other means of communications. Throughout the course students fulfill a series of interconnected tasks regarding different aspects of supply chain and operational management activities. The course concludes with a final presentation of supply chain solution for selected organization.

GRADING SYSTEM

The final grade on the course will comprise the following:

- Classroom participation – 10%;
- Individual and group tasks fulfillment – 50%
- Analysis of another team's group task – 20%;
- Final business solution presentation – 20%

METHODS OF INSTRUCTION

We will use:

- 1) Books and textbooks of foreign authors.
- 2) Research articles of foreign authors.
- 3) Practical and operational documentation
- 4) Market analyst materials
- 5) Instructions provided by the lector.

Recommended textbook:

Bowersox, Closs and Cooper, *Supply chain logistics management*, McGraw-Hill, 2013, 4th edition.