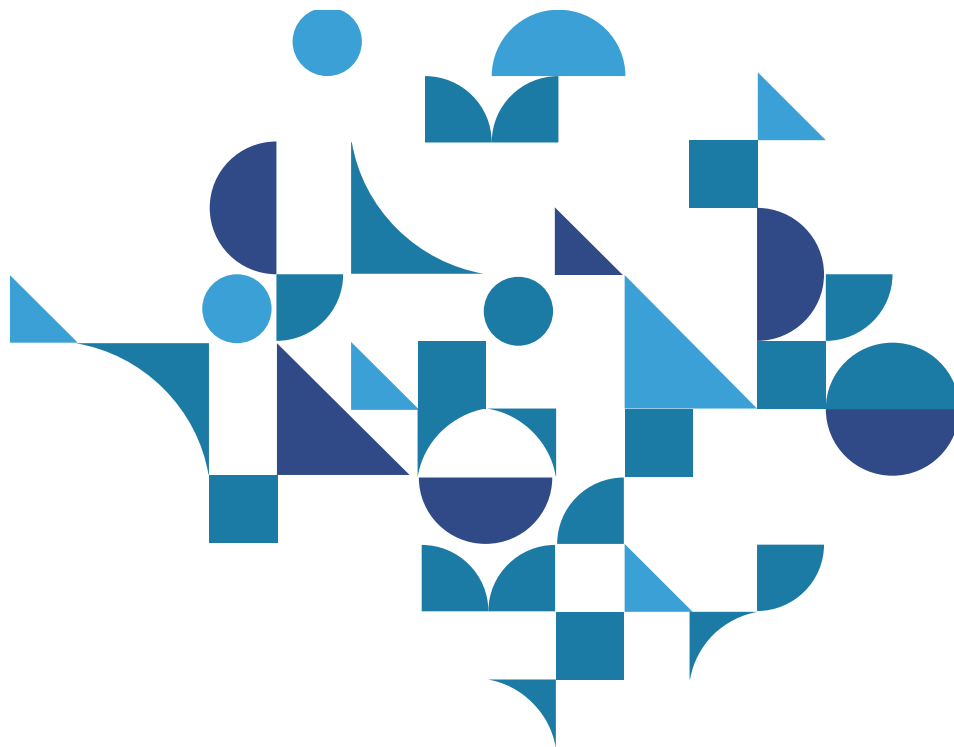




Industrial Engineering and
Management of European
Higher Education



IE3 Course Action Plan

DRAFT REPORT PUT



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AUTHORS

Agnieszka Stachowiak (PUT), Joanna Oleśków-Szłapka (PUT), Hanna Gołaś (ALCOMOT), Marek Fertsch (PUT).

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1. EXISTING COURSE MODULES

1.1. Course module: Traditional and contemporary manufacturing systems

Master Program: Logistics

Effort: 5 ECTS (125h).

Students: ~ 20 students.

Language: English

It is an elective course in the master program.

1.1.1. Objectives

Mastering the student's knowledge, skills and social competences related to the essence, scope of application and methods of designing and implementing modern production systems.

1.1.2. Current Syllabus

Course-related learning outcomes

Knowledge

1. dependencies in the given area and their relations with logistics [P7S_WG_01]
2. issues in the field of production engineering and its connections with the field of logistics [P7S_WG_02]
3. extended concepts for logistics and its detailed problems and supply chain management [P7S_WG_05]
4. detailed methods, tools and techniques characteristic for studied subject on the course of logistics [P7S_WK_01]

Skills

1. collect on the basis of the literature of the subject and other sources (in Polish and English) and in an orderly manner, provide information on the problem within the framework of logistics and its specific issues and supply chain management [P7S_UW_01]
2. communicate using appropriately selected resources in a professional environment and in other environments as part of logistics and its specific issues as well as supply chain management [P7S_UW_02]
3. make a critical analysis of technical solutions used in the analyzed logistics system (in particular with regard to devices, objects and processes) [P7S_UW_04]
4. assess the suitability and the possibility of using new achievements (techniques and technologies) in the field of logistics and functionally related areas [P7S_UW_06]
5. formulate and solve tasks through interdisciplinary integration of knowledge from different fields and disciplines used to design logistics systems [P7S_UO_01]
6. identify changes in requirements, standards, regulations, technical progress and the reality of the labor market, and on their basis determine the need to supplement own and other knowledge [P7S_UU_01]

Social competences

1. recognize causal relationships in achieving the set goals and grading the significance of alternative or competitive tasks [P7S_KK_01]

- responsibility for own work and readiness to comply with the rules of working in a team and taking responsibility for the tasks carried out jointly [P7S_KR_01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows: assessment based on a team-developed project, grade based on written credit (exam)

Programme content

the lecture begins with a reminder of typical production system design methods and techniques used in classic production systems - the balance model and assembly line balancing model, and the classification of classic production units according to the American-European model. Next, the methods of designing production systems according to the JiT concept (0 inventory), lean production systems and agile production systems are discussed. During design classes, students design, according to the teacher's instructions, a selected production system.

Teaching methods

- Lecture: multimedia presentation, illustrated with examples on the board.
- Projects: multimedia presentation illustrated with examples given on the board and performance of tasks given by the teacher.

1.2. Course module: Supply chain management

Master Program: Logistics

Effort: 5 ECTS (125h).

Students: ~ 20 students.

Language: English

It is an compulsory course in the master program.

1.2.1. Objectives

Mastering the student's knowledge, skills and social competences related to supply chain management

1.2.2. Current Syllabus

Course-related learning outcomes

Knowledge

- dependencies in the given area and their relations with logistics [P7S_WG_01]
- issues in the field of production engineering and its connections with the field of logistics [P7S_WG_02]
- extended concepts for logistics and its detailed problems and supply chain management [P7S_WG_05]
- detailed methods, tools and techniques characteristic for studied subject on the course of logistics [P7S_WK_01]

Skills

1. collect on the basis of the literature of the subject and other sources (in Polish and English) and in an orderly manner, provide information on the problem within the framework of logistics and its specific issues and supply chain management [P7S_UW_01]
2. design, using appropriate methods and techniques, the object, system or logistic process and the process associated with it including defining the path of its implementation and potential threats or limitations in analyzed domain [P7S_UW_05]
3. design, using appropriately selected means, an experiment, a process of analysis or a scientific study solving a problem within the framework of logistics and its specific issues as well as supply chain management [P7S_UK_01]
4. identify changes in requirements, standards, regulations, technical progress and the reality of the labor market, and on their basis determine the need to supplement own and other knowledge [P7S_UU_01]

Social competences

1. responsibility for own work and readiness to comply with the rules of working in a team and taking responsibility for the tasks carried out jointly [P7S_KR_01]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows: assessment based on a team-developed project, 3 grade based on written credit (exam)

Programme content

Lecture: Supply chain as a logistics system. Supply chain models. Choosing a supply chain strategy. Strategic analysis. Krajlic, Cox, Saunders models. Olsen and Ellram model, chain. Supply chain configuration: Supply chain configuration theories. Supply chain dimensions. Physical system management: identification of available alternatives, data collection and use, selection of methods and techniques for analyzing alternatives, selection of criteria for assessing alternatives, analysis of results.

Project: In the design class, students design the supply chain specified by the lecturer.

Teaching methods

1. Lecture: multimedia presentation, illustrated with examples on the board.
2. Projects: multimedia presentation illustrated with examples given on the board and performance of tasks given by the teacher.

1.3 Need for revision

The main reason for revision is the need to update the content provided and minimize the gap between theory and business/industrial practice. Including examples and business problems in the scope of the course will result in increased understanding of manufacturing systems and processes. Analyzing industrial case studies and working in teams will improve soft skills of students by recognizing their communication skills, capabilities and talents, as well as areas for improvement. Students will work with real data, technical parameters, constraints, and industry-sensitive variables solving problems managers face in their work. Elements of experimental learning, project approach, optimization and simulation will be included to stimulate knowledge development and benefit from synergy emerging from cooperation between academia and industry.

2. REVISION RELATED TO THE BoK

The improvement of courses was conducted according to the assumptions of BoK. The addressed expectations of companies included developing knowledge, skills and competences in:

- Project management – by including project management methodology in the courses
- Operations management – by addressing operational issues in problems to be solved description
- Quality management – by including quality management tools and methods in problems analysis
- Strategic management – by seeking for synergy between company's strategy and operational solutions developed by students

Concerning digital tools, the ones included in courses, due to their scope, are Management Software Tools implemented in the company and supporting manufacturing management and supply chain management. Simulation and expert-based systems implementation for decision making are also included in the course programs.

Concerning Soft the most important addressed in courses and expected from students (as an outcome, after finishing course) include problem solving and decision making; team working and communication skills necessary to analyze and solve problems presented to students.

2.1.Course module: Traditional and contemporary manufacturing systems

- Redesign goal:
 - Improve soft skills: creative thinking, problem solving, group working & hard skills: using simulation and expert-based systems for decision making
- Redesign approach:
 - Benefit from knowledge on lean and agile manufacturing, group working, simulation and expert-based approach for decision making for real-life cases provided by Alco-Mot
- Learning outcomes:
 - As expected according to FEM/PUT/MES

Redesigned content

Focused on project to strengthen soft skills and competences expected by companies:

Course scenario:

- Organizational meeting: presenting goal and scope of the project, forming groups, assigning the topics:
 - 1) Production planning and control in limited resources environment
 - 2) TPM (lean approach)
 - 3) Competences matrix for manufacturing employees (agile approach)
 - Industrial visit, data collection
 - Problem identification, analysis, solutions development and coordination

- Developing documentation including feasibility study, cost estimates and schedules
- Presentation of the integrated solution

2.2 Course module: Supply chain management

- Redesign goal:
 - Improve soft skills: creative thinking, problem solving, group working & hard skills: using simulation and expert-based systems for decision making
- Redesign approach:
 - Benefit from knowledge on contemporary trends in SCM including closed-loop SCM, global purchasing, group working, simulation and expert-based approach for managing real-life cases provided by Alco-Mot
- Learning outcomes:
 - As expected according to FEM/PUT/MES

Redesigned content

Focused on project to strengthen soft skills and competences expected by companies:

Course scenario:

- Organizational meeting: presenting goal and scope of the project, forming groups, assigning the topics:

1) Closed-loop material flows in supply chain

2) Packaging flows

3) Forecasting and purchasing (strategy and operation)

- Industrial visit, data collection
- Problem identification, analysis, solutions development and coordination
- Developing documentation including feasibility study, cost estimates and schedules
- Presentation of the integrated solution

3. TEACHING METHODOLOGY

The teaching methodology implemented needs to respond to requirements of contemporary students and benefit from contemporary technologies providing flexibility of time and space on one hand and mentoring and teacher's support on the other. The set suggested is composed to function both in real and digital conditions, in synchronous and asynchronous mode and includes:

1. Face-to-Face and/or distant content providing in synchronous mode
2. Team working: problem solving in real or virtual environment under teachers supervision
3. On-site/industrial visits and/or Virtual tours of manufacturing facilities;
4. Digital Learning Pills (micro-learning); will be prepared in a further step.

Lectures, supported mainly by PPT presentations and video materials, available at the Moodle platform, conducted face-to-face. Mini-test at Moodle platform to assess material understanding.

Project focused on problem-solving, solutions design and teamwork designed and performed in collaboration with the industrial partner ALCO-MOT (details are in section 4

and section 5).

4. IMPLEMENTATION OF THE REVISED COURSE MODULE

The revised courses are implemented in the winter semester 2021/2022

The content is available at Moodle platform

5. INVOLVEMENT OF THE INDUSTRIAL PARTNERS

ALCOMOT contributed to courses redesign by providing business insight and data to be used in the projects for both courses. The company offers on-site/industrial visit opportunity and offers experts knowledge of its employees in the areas of manufacturing and supply chain management.

Course materials were development with strong support of ALCOMOT which resulted in improving practical value of the content provided. High academic competences of ALCOMOT CEO were crucial in providing also high level scientific value in the redesigned courses. Continuous cooperation with ALCOMOT will provide continuous improvement of the courses and update of problems student need to solve – making them aware of challenges contemporary companies have to face.

6. COURSE MODULE EVALUATION

Courses will be evaluated after they are completed.

There is obligatory course evaluation conducted regularly by FEM PUT, yet to get the feedback in timeframe required by the IE3 project, additional assessment will be made by course teachers.

The questionnaires will be developed basing on the following criteria:

Knowledge content

Teaching Methodology

Practical Value