Courses Offered in English for Erasmus+ Students in the 2025/2026 Academic Year

Field of study: **Logistics**
Faculty of Computer Science and Technology
1st degree engineering studies with a practical profile
Stationary Studies

WINTER SEMESTER

No.	COURSE NAME	COURSE NAME IN POLISH	SEMESTER	ECTS
1	Engineering Drawing	Grafika inżynierska	1	4
2	Introduction to Logistics	Wprowadzenie do logistyki	1	2
3	Logistics infrastructure	Infrastruktura logistyczna	1	5
4	Distribution Logistics	Logistyka dystrybucji	3	5
5	Warehousing	Technologia magazynowania	3	4
6	Inventory Management Fundamentals	Podstawy zarządzania zapasami	3	4
7	Internal Transport	Transport wewnątrzzakładowy	3	3
8	Databases	Bazy danych	3	3
9	Artificial Intelligence Methods in logisticsLogistics Management	Metody sztucznej inteligencji w logistyce	5	5
10	Logistics Management	Zarządzanie logistyczne	5	5
11	Freight ForwardingMultimodal and Intermodal Transport	Spedycja	5	4
12	Multimodal and Intermodal Transport	Transport multimodalny i intermodalny	5	4
13	Logistics 4.0	Logistyka 4.0	5	4
			TOTAL	48

Courses Offered in English for Erasmus+ Students in the 2025/2026 Academic Year

Field of study: **Logistics**
Faculty of Computer Science and Technology
1st degree engineering studies with a practical profile
Stationary Studies

SUMMER SEMESTER

No.	COURSE NAME	COURSE NAME IN POLISH	SEMESTER	ECTS
1	Procurement and Production Logistics	Logistyka zaopatrzenia i produkcji	2	5
2	Transport	Technologia transportu	2	5
3	Basics of Programming	Podstawy programowania	2	3
4	Methods of Operations Research and Optimization	Metody badań operacyjnych i optymalizacji	4	5
5	Automatization and Robotization in Logistics	Automatyzacja i robotyzacja procesów w logistyce	4	4
6	Supply Chain Management	Zarządzanie łańcuchem dostaw	4	5
7	Data Warehouse	Hurtownie danych	4	3
			TOTAL	30

SEMESTER 1

Engineering Drawing

Learning the basics of descriptive geometry and the principles of technical drawing. Developing the ability to draw objects with complex geometry. Preparing students to read and create technical drawings in orthogonal and axonometric projections. Acquiring the ability to create technical documentation in the form of assembly drawings. Mastering CAD software for creating technical drawings.

Topics:

1. Fundamentals of descriptive geometry, types of planes and projection. Representation of basic elements: point, line, plane.
2. Standardised elements of technical drawing.
3. Projection of objects in technical drawing.
4. Views, sections, layouts.
5. Principles of dimensioning, tolerancing of dimensions and shape and position.
6. Designation of surface roughness and waviness.
7. Connection of machine parts.
8. Assembly and detail drawings
9. Elements of technical construction drawing.

Introduction to Logistics

The goal of the course is to familiarise students with the basic elements of logistics, logistics processes and the functioning of logistics systems, including physical and information flow processes in the supply chain.

Topics:

1. Essence, subject matter and development of logistics
2. System and process approach in logistics
3. Structure of logistics systems - principles of operation of modern logistics systems
4. Logistics management in business
5. Logistics of supply, production and distribution
6. Infrastructure of logistic processes
7. Logistics in transportation
8. Logistics services and logistics customer service
9. Logistics in transportation
10. International logistics - selected issues
11. Types of logistics services
12. logistic customer service - elements and standards of service

Logistics infrastructure

Familiarisation with the properties and functions of the individual elements of the logistics infrastructure, which determine the realisation of physical and information flows; presentation of the techniques and technologies used in the creation and use of logistics infrastructure; explanation of the determinants and decision-making processes relating to logistics infrastructure.

Topics:

1. The concept and role of logistics infrastructure in the logistics system.
2. Classification of elements of logistics infrastructure and characteristics of its individual components
3. Transport infrastructure in Poland and Europe
4. Elements of linear and point infrastructure of transport: road, rail, air, inland waterway, sea and transmission.
5. Warehouse infrastructure, means of cargo manipulation, formation of cargo units
6. Logistics centers - functions, classification, principles of site selection, management of processes in a logistics center, legal conditions.
7. Types and functions of handling equipment used in logistics terminals.
8. ICT infrastructure
9. Conceptual design of a logistics center
10. Defining the function of the logistics center
11. Selecting the location of the center
12. Planning the elements of transport infrastructure
13. Concept of material flow in the logistics center

SEMESTER 2

Procurement and Production Logistics

Introduction the subject of basic problems concerning the management of procurement processes, in production and service activities, introduction to production logistics, its importance and ways to study and improve logistical processes description of efficiency criteria for conducting procurement processes, indication of methods and techniques for managing procurement processes.

Topics:

1. Logistics systems in the economy and in business.
2. Supply logistics as a component of the enterprise logistics system and supply chain.
3. Functions of procurement. methods of metarial requirements planning.
4. Selection of sources of supply, production cooperation - integrative, cooperative and non-contractual dimensions. Components of procurement costs. Tasks and types of warehouses.
5. Storage systems and technology. Planning and optimization of material flows in a warehouse. Transport systems and techniques in the warehouse.
6. Planning of production processes.
7. Production and flow control of materials and finished goods, objectives and methods.
8. IT technologies in supply logistics GS1, MRP, ERP, EDI.
9. Integration of procurement and production logistics.
10. Inventories and their categories of manufacturing, trading and distribution enterprises.
11. Determination of norms of consumption. Stock levels of warehouse inventories.

Transport

The subject matter of the course includes transport technologies and the factors that determine their use in various modes of transport. Students acquire the ability to analyze and apply specific transport technologies in terms of the characteristics of transported cargo.

Topics:

1. Basic concepts of transport - classification of transport. Structure of the transport process.
2. Transport infrastructure and its impact on the implementation of transport processes. European transport

corridors, TEN-T network.

3. Characteristics of means of transport, machinery and cargo equipment.
4. Cargo as an object of transport - transport susceptibility of cargo, cargo classification.
5. Transport and storage packaging. Container loading units.
6. Transport technologies in road and rail transport.
7. Freight technologies in inland waterway and maritime transport.
8. Cargo transport technologies in air transport.
9. Combined transport - freight technologies in intermodal transport.
10. Energy consumption of transport and motion resistance. Energy sources in transport and their impact on the environment.
11. Organisational and legal aspects of transport.

Basics of Programming

Topics:

1. Basic information about the Python language - installation, creating and running programs, installing libraries
2. Types, data structures, lists, tuples, dictionaries.
3. Input/output operations, file operations. Instructions. Logical and mathematical operators.
4. Definition of functions.
5. Functions, passing parameters, returning values, recursion.
6. Functional and object-oriented programming.Numpy, SciPy, Matplotlib

SEMESTER 3

Distribution Logistics

The aim of the course is to familiarise students with the processes of distribution and the tools used to implement them. To introduce the different types of distribution channels and to develop the ability to design them according to specific conditions and needs. To introduce the main performance measures of distribution systems and to develop critical thinking leading to the improvement of existing solutions.

Topics:

1. The place of distribution logistics in a company's logistics system.
2. The concept and importance of physical distribution.
3. Tasks and types of distribution logistics - decision problems of distribution.
4. Basic components of the distribution process.
5. Distribution models.
6. Distribution management and introduction to the concept of integrated supply chain management. Marketing distribution channels.
7. Wholesale trade.
8. Retailing and customer service in the context of legal requirements.
9. Shaping the relationship between manufacturer, retailer and customer in distribution channels.
10. Internet sales - legal requirements.
11. E-commerce distribution logistics. Basics of coordination in the supply chain

Warehousing

The subject covers issues of storage processes and their effective use in the logistical process. The didactic aim is to familiarise students with the processes of efficient and effective management of material flow in warehouses.

Topics:

1. Functions and types of warehouses,
2. Organisation of the warehouse process, storage programme and size of the warehouse,
3. Means of transport and warehouse equipment,
4. Functional and spatial arrangements of warehouses, storage methods, classification and technical solutions of transport systems in warehouses,
5. Material and information flow processes in warehouses, picking processes.
6. ABC classification in warehousing.
7. Inventory and material responsibility.
8. Inventory management, methods of arranging stock in the storage area.
9. Methods and measures for evaluating warehouse management.
10. Dimensioning of storage processes, storage inputs and costs, scope of design arrangements,
11. Example of storage technology design,
12. Requirements for flooring and racking in warehouses operated by multi-purpose trucks,
13. Fire and climatic conditions in the storage of materials

Inventory Management Fundamentals

The aim of the course is to familiarise students with the most important problems of inventory management under conditions of independent demand and to develop in them the ability to make operational decisions on inventory renewal.

Topics:

1. Functions and strategies of stocks in logistics systems
2. Classification of stocks, stock structure
3. Methods for analysing and preventing stock obsolescence
4. Basic elements of stock management for dependent and independent demand
5. Build-up, maintenance and out-of-stock costs
6. Demand analysis, demand forecasting
7. Definitions of customer service levels
8. Development of safety stock, restocking systems, optimisation of working stocks
9. Management of stocks of assortment groups

Internal Transport

The aim of the course is to provide students with knowledge of materials handling technology, construction and parameters of materials handling equipment, new technologies in materials handling, as well as analysing, shaping and dimensioning logistics systems in industry and distribution.

Topics:

1. Definitions and scope of internal transport,
2. Principles and methods of internal transport analysis,
3. Methods of recording internal transport, classifications and functional characteristics of selected means of internal transport (e.g. overhead cranes, rack stacker cranes, transport trolleys, conveyors),
4. Time standards in internal transport, cycle times,
5. Types and capacities of internal transport systems,
6. Flow conditions in transport systems, stacking conditions in transport systems,
7. Dimensioning of internal transport processes.

Databases

Providing the theory behind relational databases. To discuss the process of normalisation and database creation. To learn the query language used in a relational database. To teach the basics of creating, modifying and populating new objects. To familiarise with transactional processing.

Topics:

1. Introduction to databases. Fundamentals of the SQL language.
2. Relational algebra. Character expressions and functions.
3. Integer constraints. Text and numeric functions. Aggregating functions.
4. Stages of relational database design. Nested queries.
5. Relationship normalisation. Nested queries.
6. Entity Relationship Diagrams. Queries with external join. Using CONNECT BY PRIOR and START WITH. Set and pseudo-set operators.
7. Transactional processing at different levels of isolation.
8. DDL and DML language.

SEMESTER 4

Methods of Operations Research and Optimization

The subject covers topics in operational research and mathematical methods of optimisation, design of logistic processes. The didactic goal is to acquire knowledge and skills of building and using mathematical models supporting decision-making processes. Course topics include operational research, optimisation theory and mathematical programming.

Topics:
1. General methodological problems - the decision problem and its model,
2. Introduction to optimisation and operations research.
3. Linear programming
4. Transport problem: distribution problem, intermediary problem, minimisation of empty runs, travelling salesman problem.
5. Multi-criteria optimisation
6. Optimum in the Pareto sense
7. Dynamic programming: the commutator problem, the work allocation problem.
8. Dynamic resource allocation problem, inventory management.
9. Non-linear programming: maximising a non-linear revenue function.
10. Inventory management models and the economic supply batch model.
11. Network analysis: critical path, CPM and PERT method, time-cost analysis, network flow maximisation.
12. Decision risk: decision trees, gardener's conundrum, newspaper distributor problem.
13. Optimisation of number of inventory, optimal number of service channels, stochastic Monte Carlo simulation.
14. Decision uncertainty: game theory, non-zero sum game, Nash equilibrium.

Automatization and Robotization in Logistics

The aim of the course is to introduce the principles used in the design of automated control and regulation systems using mechatronic devices. Principles of design evaluation, simulation of regulated waveforms and visualization of designed automated systems.The use of robots and the construction and operation of robotic systems. Multimedia techniques to visualize the technical solution.

Topics:

1. Functional characteristics of the devices that make up automation systems. Examples of industrial control, regulation and measurement systems.
2. Principles of creating circuit diagrams. Examples of automation schemes and circuit diagrams in industrial applications. Automation of selected processes. Selection of the type of controller, selection criteria.
3. Robot as a computer system. Robot as a mechanical structure. Manufacturing and service processes.
4. Robotic system, its components and configurations. Transport in the close vicinity of the robot. Control of the robotic system.
5. Examples of robot applications: close-quarters transport, logistics, industry.
6. 6 Robotic system design: Consideration of robot application; robot selection; products, scenarios and visions for industrial and service robotization. Design of grippers and other end effectors: actuators; structural characters; interfacing. Non-technical aspects of robotization: economic-organizational, social, ethical. Robotization planning techniques.

Supply Chain Management

The aim of the course is to familiarise students with the latest knowledge in supply chain management. Mechanisms of coordination in supply chains, methods, tools, concepts used in supply chain management and distribution logistics.

Topics:

1. Concept of chain and supply network.
2. Classifications of supply chains.
3. Contemporary determinants of supply chains.
4. Genesis, essence and objectives of supply chain management.
5. Integration of logistics processes in supply chains.
6. Factors of supply chain management.
7. Efficiency and effectiveness of supply chains and networks.
8. Supply chain coordination constraints.
9. Design of global supply chains and networks.
10. Information technologies in the supply chain.
11. The importance of logistics centers in the effective operation of supply chains.
12. Specifics of food supply chains.

Data Warehouse

The subject covers topics in the field of databases and data warehousing. The course objective is to introduce logical models and architecture of data warehouses, as well as mechanisms for creating and accessing data warehouses.

Topics:

1. Introduction to data analysis, data warehousing and business intelligence Classifications of supply chains.
2. OLTP transactional systems vs. OLTP analytical systems, SQLBI technology stack.
3. Data warehouse system architectures.
4. Data modelling. Multidimensional data warehouse model,
5. Components of the data model: fact tables, dimension tables, measures, KPIs.
6. ETL processes: extraction, transformation and loading into the warehouse.
7. Data integration for the data warehouse, ETL layer design.
8. Design of data flows in ETL processes.

9. Information technologies in the supply chain.
10. Use of SQL language and analytical functions in data analysis.
11. Data refresh issues in the data warehouse.

SEMESTER 5

Artificial Intelligence Methods in logistics

The subject covers issues in the field of artificial intelligence methods and techniques. The didactic goal is for students to acquire practical skills in solving logistics problems using artificial intelligence algorithms. Topics covered in the course include issues related to artificial intelligence algorithms, artificial neural networks, genetic algorithms, fuzzy sets and expert systems.

Topics:

1. Study of artificial neural network models in terms of their ability to predict functions of multiple variables.
2. The use of artificial neural networks in solving prediction issues - classification and regression problem.
3. Software used to design artificial neural networks:
4. Genetic algorithms in applications of selection of proportions of production components.
5. Application of genetic algorithms to solve the supply optimization problem.
6. Application of genetic algorithms to the solution of the problem of optimization of the route of travel.
7. Application of genetic algorithms to solve the problem of uniform loading.
8. Application of genetic algorithms to solve the delivery scheduling problem.
9. Genetic algorithms in transportation cost determination problems.
10. Application of genetic algorithms to solve the problem of order portfolio determination.
11. Application of genetic algorithms to solve the problem of organizing an advertising campaign.
12. Fuzzy logic in decision making.

Logistics Management

The aim of the course is to familiarise students with the elements of management in logistics processes. Polish and European logistics market. Logistics networks. Inventory and storage management. Planning of operations.

Topics:

1. Enerprise Resource Planning - implementation .
2. Logistics pipeline configurations in the European and Polish market.
3. Supply chain management.
4. The place of logistics in modern production management.
5. Factors shaping changes in logistics.
6. Instruments of logistics management.
7. Relationship management in supply chains.
8. Impact of internationalization of operations on reconfiguration of logistics networks.
9. Lean manufacturing system-development of research analysis skills.
10. Working with current specialized press.
11. System considerations of operational controlling in inventory management and warehouse management.
12. Logistics management in the transport and logistics sector.

Freight Forwarding

The aim of the course is to familiarise students with the essence of freight forwarding and develop skills that will allow them to independently organize domestic and international transport. The subject covers such issues as: the

importance of forwarding and forwarding activities in the logistics system, the forwarding market and its segments, the course of the forwarding process, forwarding costs and tariffs.

Topics:

1. Characteristics of forwarding, types of forwarding.
2. The role and place of the forwarder in the implementation of transport processes.
3. The essence of forwarding processes - forwarding activities and services.
4. Rights and obligations of the forwarder - legal basis of activity .
5. International nature of forwarding activities.
6. Markets for forwarding services.
7. Selection of transport gesture - trade customs and international trade rules.
8. The course of the export and import forwarding process.
9. Costs of forwarding activities.
10. Pricing of forwarding services.
11. Complex forwarding service - organization and implementation of transport chains.

Multimodal and Intermodal Transport

The didactic goal of the course is to familiarise students with multi- and intermodal transport technologies, development trends and conditions arising from EU transport policy.

Topics:

1. Definitions, concepts, characteristics and transport and handling technologies in multi- and intermodal transport.
2. The intermodal transport market in Europe: structure, main players and current trends.
3. Selected aspects of transport policy of the European Union. Intermodal transport as an element of sustainable development.
4. Technologies of multi- and intermodal transport.
5. Rail-road transport.
6. Land-sea container transport.
7. Fundamentals, principles and instruments for promoting the development of intermodal transport.
8. Intermodal terminals.
9. Selected organizational issues of intermodal transport.

Logistics 4.0

The subject covers issues related to automatic identification systems in storage, marking and identification of goods, and systems for monitoring and visualising the position of goods in storage and transport. The didactic goal is to familiarise students with the operation of modern technologies, technical devices and computer applications supporting the management of warehouse processes and production and transport management. Topics include broadening knowledge in the field of logistics towards issues related to the problem of marking, searching and monitoring goods during production, storage and transport.

Topics:

1. Information systems in warehousing
2. Automatic goods identification systems in production and storage processes
3. Tools used in automated warehousing systems
4. The use of barcodes for marking goods and transport packaging
5. Automatic character and character recognition OCR

6. Automatic image recognition systems
7. Voice recognition methods
8. RFID tagging and NFC systems
9. Object location systems RTLS
10. GPS and GSM technology in transport systems.