UNIVERSITY NORTH, UNIVERSITY CENTRE VARAŽDIN, DEPARTMENT OF LOGISTICS AND SUSTAINABLE MOBILITY

Undergraduate study program in Logistics and mobility (Bachelor program)

List of courses that can be delivered in English, including learning outcomes and course coordinators qualified to teach them in English. Teaching is conducted in the form of consultations.

1st semester (winter semester)

Informatics in Logistics – 5 ECTS
(course coordinators: Vladimir Stanisavljević, Tomislav Horvat, Željko Brček)

- Acquire basic skills in working with computers and file management. Use internet technologies for searching information. Send and receive electronic mail. Understand and apply netiquette.
- Create textual documents using word processing software. Apply different types of formatting to documents. Create tables of contents and other lists within documents. Generate mail merge documents.
- Master the use of spreadsheet software. Apply basic cell formatting, create simple and more complex aggregate functions, use conditional formatting, and for more complex data create pivot tables according to various criteria.
- Master the basic use of presentation software. Apply different templates and themes. Design individual slides, define various animations for elements and transitions between slides, and link presentations with each other and with different types of multimedia files.
- Understand the fundamentals of computer operation and operating systems. Know the basics of digital data representation and measurement units. Understand the operation of memory and disk subsystems. Be familiar with the specifics of information systems in logistics and auxiliary devices supporting logistics processes.
- Define a data model and explain conceptual, logical, and physical data models.
- Perform normalization of a relational data model and identify the normal form.
- Using DDL and DML command groups, create and use a small database for application in logistics.

Mathematics I – 6 ECTS
(course coordinator: Sanja Zlatić)

- Describe the sets of natural, integer, rational, real, and complex numbers; define arithmetic operations and perform calculations within these sets.
- Define a sequence and calculate limits of sequences. Explain and apply the basic concepts of real functions of one variable, analyze elementary functions, and sketch their graphs.
- Use differentiation rules to calculate derivatives of explicitly and implicitly defined functions.
- Apply differential calculus to determine limits of functions, equations of tangents and normals, analyze function graphs, and solve examples from everyday life.
- List and describe vector operations and calculate and apply scalar, vector, and mixed products in concrete examples.

English language – 3 ECTS
(course coordinator: Iva Grubješić)

- Upon successful completion of the course, students will be able to recognize and describe the basic grammatical categories of the English language and, based on this knowledge, independently produce grammatically correct expressions in English in various foreign-language contexts.
- Upon successful completion of the course, students will be able to independently search for and identify appropriate verb forms, noun forms, and other parts of speech in English texts, adapt them to a given register, and correctly apply them in sentences.
- Upon successful completion of the course, students will be able to recognize the cultural characteristics of English-speaking countries.
- Upon successful completion of the course, students will be able to identify, extract, and recognize the meanings of familiar and unfamiliar words from a professional text.
- Upon successful completion of the course, students will be able to compile a list of unfamiliar words from a professional text along with their basic features for use in their own foreign-language expression.
- Upon successful completion of the course, students will be able to outline the content of a text based on global and detailed reading of an English-language text and present it in both oral and written form.

Fundamentals of Economics – 5 ECTS
(course coordinator: Ante Rončević)

- Define economics as a science, the fields of macroeconomics and microeconomics, the concept of a modern market economy, and the role of the state. Explain the theory of comparative advantage.
- Explain a country's production possibility frontier, sketch and interpret production possibility diagrams with regard to the law of scarcity and the concept of opportunity cost.
- Explain descriptively and graphically the law of supply and demand according to the concept of Pareto optimum and the automatic mechanism of supply and demand equilibrium. Graphically analyze changes in supply and demand caused by changes in their determinants and explain the concept of elasticity.
- Explain the principles of consumer behavior. Explain the law of diminishing marginal productivity. Conduct a microeconomic cost analysis.
- Define factors of production and methods of calculating returns to factors of production, i.e., incomes: wages, rent, interest, and profit.
- Explain the macroeconomic goals of a national economy, methods of measuring economic activity, and the components of domestic product, consumption, and investment.
- Explain the role of the central bank, the function of the banking system, and the role of monetary policy.
- Define the main factors of economic growth and development, and the impact of exchange rates on an (open) economy.
- Explain the main factors of aggregate supply, types of unemployment, the concept of inflation, and the role of economic policies.

Fundamentals of Economic Logistics – 6 ECTS
(course coordinators: Saša Petar, Ante Klečina, Nives Domjan Kačarević)

- Identify basic terminology related to logistics activities within the supply chain.
- Describe the characteristics of planning goods flows within the structure of supply chains. List the processes and flows that occur within a supply chain system.

- Explain the structure of the entire supply chain and define and describe the phases and operational cycles of the supply chain.
- Apply appropriate methods for planning logistics activities.
- Analyze subsystems and elements of the logistics system.
- Analyze transportation costs, which are the most significant component in the structure of logistics costs.

Fundamentals of Engineering Physics I – 5 ECTS
(course coordinators: Damir Modrić, Marko Malenica)

- Define basic physical quantities and their units of measurement.
- Explain basic kinematic and dynamic relations for the motion of a material point.
- Explain Newton's laws of dynamics for a material point and apply them in various physical situations.
- Define and apply the laws of conservation of mechanical energy, linear momentum, and angular momentum.
- Express and discuss basic relations of rigid body mechanics, oscillations, and waves.
- Define basic concepts of fluid mechanics and thermodynamics and provide examples of their application.
- Apply knowledge of fundamental physical concepts from particle and rigid body mechanics, fluid mechanics, oscillations and waves, and thermodynamics to solve simple problems and exercises.

2nd semester (summer semester)

2D Design – 2 ECTS
(course coordinators: Ivan Cvitković, Nives Domjan Kačarević)

- Create a 2D drawing of a machine element with associated dimensions, as well as an assembly drawing and positional drawings.
- Construct the developed form of simple geometric bodies.

Logistics Systems and Elements – 6 ECTS
(course coordinator: Miljenko Mustapić)

- Apply theoretical knowledge in the field of logistics processes.
- Understand management of logistics organizations.
- Use logistics knowledge for rationalization and marketing purposes.
- Identify the sources and management of logistics costs.
- Know basic methods of strategic logistics planning.
- Understand the impact of interconnections between transport modes in the logistics chain.
- Understand the fundamentals of transport logistics in individual transport sectors.

Mathematics II – 7 ECTS
(course coordinator: Sanja Zlatić)

- Define the antiderivative and calculate indefinite integrals using basic properties and integration rules.
- Apply integral calculus to calculate the area under a function graph.
- Describe the concepts of matrices and determinants, list their properties, and perform calculations with matrices and determinants.
- Use matrix algebra to solve systems of linear equations and matrix equations.
- Use algorithms to determine the shortest path in a graph.
- Apply percentage calculations in more complex real-world problems.

Fundamentals of Engineering Physics II – 6 ECTS
(course coordinators: Damir Modrić, Marko Malenica)

- Define basic concepts of electromagnetism, including electric and magnetic fields, electric potential and voltage, electric current, and electrical resistance.
- Explain the generation and properties of electromagnetic waves.
- Define basic photometric quantities and units.
- Apply the fundamental laws of geometrical optics.
- Describe phenomena related to wave-particle duality.
- Explain the basic principles of quantum physics and recognize their significance in modern technologies.
- Apply knowledge from electromagnetism, optics, and modern physics to solve simple problems and exercises.

Business English I – 4 ECTS
(course coordinator: Iva Grubješić)

- After successfully completing the course, the student will be able to recognize and describe the basic grammatical categories of the English language and, based on that, independently produce grammatically correct expressions in English in varied foreign-language contexts.
- After successfully completing the course, the student will be able to independently search for and find appropriate verb forms, noun forms, and other types of words in English texts, adapt them to the given register, and correctly apply them in a sentence.
- After successfully completing the course, the student will be able to recognize the characteristics of the culture of English-speaking countries.
- After successfully completing the course, the student will be able to identify, extract, and recognize the meaning of known and unknown words from a professional text.
- After successfully completing the course, the student will be able to compile a list of unknown words from a professional text with their basic characteristics for use in their own foreign-language expression.
- After successfully completing the course, the student will be able to outline the content of a text based on global/detailed reading of an English text and present it in oral and written form.

Statistics – 5 ECTS
(course coordinator: Petra Tišler)

- After successfully completing the course, the student will be able to recognize, distinguish, and describe different combinatorial problems and use them to solve simpler tasks.
- Define basic concepts of event probability and conditional probability.
- Group and graphically represent data, calculate averages and measures of dispersion.
- Define discrete and continuous random variables and interpret them correctly.
- Describe and distinguish discrete and continuous distributions and use them to solve simpler problems and exercises.
- Explain the idea of a statistical test and describe a statistical test.
- Apply basic procedures for hypothesis testing related to expectation and correctly interpret the obtained results.
- Define the concepts of correlation and regression and apply correlation and regression analysis.

3rd semester (winter semester)

Microeconomics – 5 ECTS
(course coordinator: Dajana Maria Horvat)

- Define and explain fundamental concepts in microeconomics.
- Explain the functions of a firm, the theory of profit, and interpret how the value of a firm is determined.
- Define and interpret demand elasticity and recognize the impact of demand elasticity on total revenue.
- Explain consumer behavior and, using utility theory and indifference theory, explain how consumers make decisions about income allocation.
- Define the basic types of business costs and explain how these costs influence firm decisions.
- Explain at which level of production a firm maximizes profit.
- Draw and interpret profit maximization under monopoly or perfect competition conditions.

Sustainable Transport Systems - 5 ECTS
(course coordinator: Nives Domjan Kačarević)

- Analyze the efficiency of transport system management.
- Analyze traffic flows in urban areas.
- Classify the spatial and temporal factors of transport demand.
- Assess internal and external travel costs.
- Apply ITS technologies in specific situations.

Fundamentals of Machine Elements – 4 ECTS
(course coordinator: Mato Perić)

- Apply tolerances, fits, and surface texture (roughness).
- Identify non-detachable connections of machine elements.
- Identify detachable connections of machine elements.
- Identify machine elements for motion transmission.
- Identify power and motion transmission components.
- Identify piping systems and shut-off devices.
- Describe features, advantages, and disadvantages of machine elements.
- Describe the function and application of machine elements.
- Define the basic data required for ordering standard machine elements.

Transport Vehicles and Work Machines – 5 ECTS (course coordinators: Ante Klečina, Nives Domjan Kačarević)

- After successfully completing the course, students will be able to define fundamental concepts.
- Understand the structure of road transport vehicles and their technical-operational characteristics.
- Explain and interpret the role and importance of transport vehicles and work machines in the transport process.
- Explain and determine the factors that determine the operational characteristics of transport vehicles and work machines.
- Explain conventional and innovative technologies in transport.

Production Systems and Technologies - 5 ECTS (course coordinator: Miljenko Mustapić)

- After successfully passing the written and oral exams, the student will master the basic concepts and definitions of designing and managing production systems.
- Explain the most important parameters of assembly processes.
- Propose a manufacturing technology or technologies for a defined product.
- Explain the specifics of welding, casting, particle removal, deformation processing, and polymer processing technologies.
- Master basic procedures and methods of corrosion protection.
- Master the concepts of micro- and nanotechnology.

Warehouse Systems and Processes – 6 ECTS (course coordinator: Petra Tišler)

- After successfully completing the course, the student will be able to explain the role and importance of warehouse systems in logistics and supply chains.
- Define the basic components of a warehouse system and the main activities of the warehousing process.
- Describe the appearance and purpose of individual warehouse equipment and subsystems.
- Describe the complete material flow in warehouses, both qualitatively and quantitatively.
- Calculate basic parameters of warehouse systems and processes, including capacity, throughput, and required space.
- Analyze individual solutions of warehouse subsystems to identify their advantages and disadvantages.
- Design conceptual solutions for specific zones or subprocesses using the knowledge and skills acquired in the course.

4th semester (summer semester)

Procurement Organization with Product Knowledge - 6 ECTS
(course coordinators: Davor Grgurević, Petra Tišler)

- Independently handle basic concepts in procurement and inventory logistics.
- Understand the public procurement system in Croatia, with special reference to the Public Procurement Act.
- Know the fundamental methods used throughout the procurement process of goods and services.
- Understand basic inventory management methods, particularly determining minimum and optimal stock levels.
- Learn fundamental inventory management models.
- Acquire basic knowledge of reverse logistics.
- Apply knowledge from the domains of procurement and sales effectively in practical situations.

Business Psychology and Managerial Skills – 4 ECTS
(course coordinators: Ana Globočnik Žunac, Livia Pavletić)

- Define basic concepts in business and social psychology.
- Explain forms of group behavior and conformity.
- Understand personality traits and defense mechanisms as fundamental motivators and obstacles in achieving goals.
- Understand the importance of emotional intelligence for managing relationships in business processes.

Accounting – 5 ECTS
(course coordinator: Ivana Martinčević)

- Explain and describe the logic of double-entry bookkeeping through the recording of accounting transactions.
- Identify and explain basic accounting categories: assets, liabilities, equity, revenues, and expenses.
- Calculate accounting tasks related to bookkeeping entries using the logic of double-entry bookkeeping, distinguishing basic accounting categories through exercises.
- Identify and explain the content of fundamental financial statements, including the balance sheet and the income statement, and describe how to prepare them.
- Prepare, categorize, and complete fundamental financial statements.
- Connect and explain the interrelationships between financial statements.

Commercial Law – 5 ECTS
(course coordinators: Goran Vojković, Ivica Kustura)

- Define the concept, sources, and scope of commercial law.
- Identify individual commercial contracts and explain the rights and obligations of the contracting parties.
- Conduct independent research of sources to find the most appropriate solution in a specific situation.
- Recommend the optimal type of contract for a specific market relationship, particularly for contracts commonly encountered in logistics.
- Explain the concepts of a company, trader, enterprise, firm, business activity, registered office, and branch.

- Explain the concept, establishment, structure, and operation of partnerships, associations, cooperatives, general partnerships, limited partnerships, silent partnerships, and economic interest groupings.
- Explain the concept, historical development, economic significance, legal characteristics, establishment, structure, and specific features of joint-stock companies and limited liability companies.

Urban Transport Infrastructure - 4 ECTS
(course coordinators: Ivan Cvitković, Nives Domjan Kačarević)

- Define the basic elements of modern transport technologies and forwarding processes.
- Explain the advantages and disadvantages of individual transport technologies.
- Apply acquired knowledge to select the optimal transport technology based on given parameters.
- Explain the procedure of a specific forwarding process.
- Compare the technical elements of different transport technologies.
- Describe and analyze the most important features of each transport technology.
- Apply acquired knowledge in the organization of the transport process.

Sustainable Urban Mobility Plans - 3 ECTS
(course coordinator: Ante Klečina)

- Carry out the procedure for developing a Sustainable Urban Mobility Plan (SUMP).
- Analyze the impact of SUMP, SULP, SEAP, and SECAP on the development of urban transport systems.
- Define the fundamental groups of measures for preparing a SUMP.

Introduction to Management - 3 ECTS
(course coordinator: Dino Bartoluci)

- Recognize, describe, and interpret the basic assumptions of business management.
- Differentiate, describe, identify, interpret, and analyze the fundamental management functions: planning, organizing, leading, human resource management, and control.
- Recognize issues of ethical and responsible managerial conduct.
- Identify, interpret, and analyze environmental influences on a company.
- Apply control methods and tools, and understand control systems and levels.

5th semester (winter semester)

Industrial Logistics – 5 ECTS
(course coordinators: Veljko Kondić, Miljenko Mustapić)

- After successfully passing the exam, the student is able to explain the concept and importance of industrial logistics systems.
- Explain the fundamental characteristics of logistics in the production of food, beverages, tobacco products, textiles, and textile products.
- Explain the fundamental characteristics of logistics in the production of metals, metal products, machinery, devices, and electrical and electronic equipment.
- Explain the fundamental characteristics of logistics in the production of pulp, paper, paper products, printed materials, leather, and leather products.
- Explain the fundamental characteristics of logistics in transport vehicles and recycling.
- Understand inventory management procedures in micro-industrial logistics systems.
- Identify fixed and variable costs in micro-industrial logistics systems.
- Understand the basic principles and approaches to human resource management in micro-industrial logistics systems.

Quantitative Methods – 5 ECTS
(course coordinator: Viktorija Adamić Ciglar)

- Know and apply methods and procedures of linear programming.
- Model economic processes and translate them into linear programming concepts.
- Solve linear programming problems using the simplex method.
- Solve linear programming problems graphically.
- Apply obtained solutions to make optimal decisions.
- Solve transportation problems.
- Solve the traveling salesman problem.

Management - 5 ECTS
(course coordinator: Dino Bartoluci)

- Recognize, describe, identify, interpret, and analyze the conceptual assumptions of business management.
- Recognize, describe, identify, interpret, and analyze strategic management and leadership.
- Recognize, describe, identify, interpret, and analyze the fundamental management functions: planning, organizing, leading, human resource management, and control.
- Recognize, describe, identify, interpret, and analyze contemporary management concepts.
- Recognize, describe, and identify business decision-making methods. Apply methods and tools of business decision-making to analyze, calculate, solve, and interpret specific business problems.

International Trade Business – 6 ECTS
(course coordinators: Davor Grgurević, Petra Tišler)

- Independently handle basic concepts related to international trade.
- Recognize the purpose and importance of foreign trade and foreign trade operations.
- Understand the role of business on commodity exchanges.
- Know foreign trade operations.
- Independently manage the procedures for executing export and import transactions.

Reliability and Maintenance of Technical Systems – 5 ECTS
(course coordinator: Veljko Kondić)

- After successfully completing the course, the student will be able to define the function and objectives of maintenance.
- Explain the role and importance of maintenance in the lifecycle of a facility.
- Define the flow of information when a maintenance intervention is required.
- Define criteria for the procurement of new equipment from a maintenance perspective.
- Calculate the reliability of an industrial facility.
- Identify maintenance costs.
- Identify maintenance methods.
- Explain the significance of diagnostics in maintenance.

Transport Logistics – 5 ECTS
(course coordinators: Ante Klečina, Nives Domjan Kačarević)

- Understand the basic principles and content of logistics, define the role and position of transport logistics within the logistics system, and its integration into the overall logistics system.
- Analyze the impact of transport on the development of international trade and commodity exchange, and analyze the structure of goods flows.
- Understand the organization of logistics in individual companies and, through seminar work, examine the logistics factors contributing to successful business operations.
- Analyze different transport modes and their interconnections in transport and logistics, as well as modern transport technologies in transport logistics, and assess the impact of transport and transport logistics on sustainable development.
- Understand the role and interconnection of logistics activities in transport, become familiar with modern logistics concepts and strategies, and gain knowledge of conventions and laws covering the field of transport logistics.

6th semester (summer semester)

Controlling –
4 ECTS (course coordinator: Vesna Sesar)

- Understand the role of controlling in a company.
- Understand the differences between various types of controlling and the controlling of specific company functions.
- Explain and differentiate instruments of operational and strategic controlling.
- Apply appropriate tools to support decision-making in controlling at strategic, tactical, and operational levels.

Internship – 5 ECTS
(course coordinator: Nives Domjan Kačarević)

- Apply knowledge acquired from general and specialized courses in practical work (assessed by the mentor).
- Describe the activity, organizational structure, and production technology of the company or institution where the internship is carried out, and record this in the internship diary.
- Perform, under supervision or independently, specific stages of practical tasks in the chosen area of the internship, documenting daily activities in the internship diary.

Technical and Design Documentation – 4 ECTS
(course coordinators: Ivan Cvitković, Damjan Županić)

- Understand the mandatory components of design documentation according to levels (conceptual solution, conceptual design, main design, detailed design, as-built documentation).
- Identify and connect types of projects that can be implemented without building permits versus projects requiring location, construction, or usage permits, and understand the procedure for obtaining location and construction permits.
- Prepare a Traffic Study with all required components and identify all stakeholders involved in its preparation and approval.
- Understand the interrelationship between design documentation and the Traffic Study, depending on the level of detail required in the design documentation.

Quality Management – 4 ECTS
(course coordinators: Krešimir Buntak, Viktorija Adamić Ciglar)

- After successfully completing the course, the student will be able to recognize the importance of product and service quality in modern production.
- Analyze the aspects of quality.
- Explain the structure of a quality management system based on the ISO 9001 standard.
- Calculate basic statistical indicators in quality control.
- Calculate process capability indicators.
- Apply the seven basic quality improvement tools.
- Recognize the application of other tools and methods for quality improvement.
- Describe the environmental management system in a company.
- Explain the functioning of occupational health and safety management systems.