



# International Programme

List of courses taught in English

## Logistics Technologies

Master degree level

*Academic year 2020-2021*

*Summer semester*

## *Logistics Technologies*

<b>Course code</b>	<b>Course title</b>	<b>Number of ECTS credits</b>
S_N_AIL	Applied Informatics in Logistics	6
S_N_FLP	Physics in Logistics Processes	6
S_N_TCL	Technology of City Logistics	6
S_N_DOL	Transport Logistics	6



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## Applied Informatics in Logistics (Code: S\_N\_AIL) | Number of credits: 6

### *Course objectives*

The aim of the course is to give students the tools for utilization of the methods and information technology in logistic operations, acquaint students with the possibility of solving the logistics activities, explain how to use the logistics information system to practical steps within the proposal and management of logistics processes. The graduate of the course: • is capable to analyze the available information, utilize the information system as a strategic element of logistics and use the simulation techniques, • demonstrates the basic knowledge of the logistics information analysis and can utilize the optimization methods in logistics systems for their management, • can describe, select and use the tools in the form of statistical methods application, operational methods and evaluation methods in logistics.

### *Topics*

1. Systems and their basic terms in the context of logistics
2. Description of the characteristics of informatics, information systems and information technologies
3. Fundamentals and systematic approach in the context of integrated logistics
4. Models of information systems in terms of logistics, requirements for information systems and their importance in the context of logistics
5. Models of logistics information systems architecture and their approaches
6. Models of enterprise logistics systems
7. Proposal of systems for the warehouse logistics information system
8. System methodology of logistics information systems
9. Informatics in the context of supply chain
10. Applied Informatics in the context of automatic identification
11. Applied Informatics in passenger transport
12. Applied Informatics in the context of production logistics, geographic information systems
13. Informatics and logistics technologies

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**Physics in Logistics Processes (Code: S\_N\_FLP) | Number of credits: 6***Course objectives*

The aim of the course is to get the students acquainted with physical and technical aspects of material and information flows in logistics systems. Graduates demonstrate sufficient knowledge of applied mechanics, physical fields, electromagnetic waves and observation methods of motion of bodies.

*Topics*

1. Circular motion in mechanical systems. Forces in curvilinear motion. Centrifugal regulators. The principle of dynamic sensor. Torque and angular momentum. Work as a trace effect of the force. Impulse of force as a time effect of the force. Momentum and impulse during rotational movement. Force transfer in couplings and gearboxes.
2. Moment of inertia. Flywheels and their practical use. Free flywheel, Maxwell flywheel, gimbal. Heavy flywheel, its precession and nutation.
3. Gyroscopic effects in transport equipment in curves (aircraft, ship, rocket). Gyroscopic effects in multiple- and single-rail vehicles. Stabilization of flying discs and missiles.
4. Four laws of thermodynamics. Carnot efficiency. The conversion of thermal energy into mechanical one.
5. Gravitational field. Intensity and potential of gravitational field. Movements in the Earth gravity field.
6. Electrostatic Field. Intensity and potential of electrostatic field. Electrostatic field of charged conductors.
7. Electric current. Conductors, insulators and semiconductors.
8. Magnetic field of permanent currents. Magnetic circuits. Generation of the AC voltage in a rotating loop.
9. Closed and open electromagnetic oscillator. Electromagnetic waves generation and propagation. Classification of electromagnetic waves.



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10. Light as electromagnetic waves and corpuscular radiation. Coherent sources. Light interference. Diffraction by the opaque edge, slit and grating. Light polarization, birefringence and its use in practice.
  11. Photon energy, mass and momentum. Einstein's equation of photoelectric effect. Wave-particle dual nature of light.
  12. Coherent and incoherent sources for optical communication systems. Detectors of radiation. Optical fiber and planar waveguide structures.
  13. Signal transmission by optical fiber. Optical signals processing. Information transfer in atmosphere and other dielectric environment. The principle of satellite Earth observation.



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**Technology of City Logistics (Code: S\_N\_TCL) | Number of credits: 6**

*Course objectives*

The aim of the course is to acquaint students with the nature and solution of logistics problems of cities in different concepts of partial solutions to complex approach. They become familiar with the classic concept of city logistics solutions as flows of goods and other materials to the centers of large cities, widespread concept involving all relevant components of transport in the whole agglomeration, the issue of freight and public transport, including its integration as an important part of city logistics and related logistics and environmental aspect. Graduates will be able to identify strengths and weaknesses in transport in towns and cities, can solve the task scheduling and optimization of transport and traffic flows in cities. They will be able to define and describe the properties of both passenger and freight transport, environment and transport technology, able to define the basic parameters of a comprehensive solution of this particular issue.

*Topics*

1. The issues of City Logistics.
2. Road transport of the world cities.
3. Transport as a system.
4. System approach to urban transport.
5. Definition of transport services.
6. Modeling the operation in the transport sector.
7. Forecasting and modeling the transport needs.
8. Creating the transport process using the PTV VISION.
9. Logistics of supplying the city by freight transport.
10. Technology of operating the city by freight transport.



11. Data collection and analysis of permeability.
12. Analysis and modeling the population movements.
13. Analysis of connectivity and appropriateness of cartography methods.

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**Transport Logistics (Code: S\_N\_DOL) | Number of credits: 6***Course objectives*

The aim of the course is to acquaint students with problems of transport logistics and its relationship to marketing, to apprise them with the different modes of transport, a combination of different modes of transport and other transport options. After successful completion of the course, students can describe basic concepts and approaches used in logistics, describe problems associated with transport costs, performance measure in the transportation, international aspects of transport, the main activities in the field of transportation for shippers and carriers, classify traffic management and identify key technologies and the importance of information.

*Topics*

1. Introduction to transport logistics
2. Legislation in transport, European Transport policy, Transport policy in Czech Republic
3. Characteristics of carriers and transport services
4. Transport infrastructure in the Czech Republic
5. Transport infrastructure in Europe
6. The provider of transportation services
7. Intermodal transport systems
8. Management of Transport, decision-making of the mode of transport
9. Road transport technologies
10. Railway transport technologies
11. Air transport and water transport technologies
12. Logistics centers and their connection to transport systems
13. Transport Logistics and Environment