
# Informatic Decision Support Tools

Master Study Programme





# Faculty of Management Science and Informatics

- Established in 1990
- Education and research activities in:
  - management, marketing, logistics, business, the creation of transport and communication systems
  - analysis, synthesis, designing and implementing of technical means of information and management systems
  - controlling and optimizing transport of goods and passenger, management and optimization of data bases
  - optimization of transmission and processing of information, issues of multimedia information, graphics systems
  - simulation equipment for communications networks and systems and mathematical modeling
- Provides
  - full-time Bachelor degree studies (3 years)
  - full-time Master degree studies (2 years)
  - full-time PhD studies (3 years)
  - part-time PhD studies (5 years)
- Campuses
  - Žilina - PhD studies, Master degree studies, Bachelor degree studies
  - Prievidza - Bachelor degree studies





# Department of Transportation Networks

## Department Profile

- Provides teaching courses in
  - logistics,
  - information tools for decision support,
  - optimization techniques and mathematical modelling
  - simulation techniques, simulation tools and models
  - computer graphics,
  - multimedia systems for Tele-education,
  - GIS systems.

- Scientific research activities in the management of large systems, prediction of phenomena in these systems and the optimization decisions related to building and managing complex systems. These are problems of management and optimize the transport of objects (goods, passenger information), information transfer, information processing and creation of integrated interactive information systems to support decision-making contexts, including economic and technical support.

# Department of Transportation Networks

## Science and Research Activities

- Integrated System Supporting the Planning and Decision-making activities in Transport and Logistic Systems
- Multimedia Systems for Tele-education
- Simulation tools and models
- Simulations models for Technological process

## International and National Grants

2003-2005 NATURE-GIS Using geographic information to nature protection (P.Fabián)

2004-2006 - Agent's architecture-oriented simulation models of service systems (V. Klima)

2006-2008 - For decision support in the design of complex distribution and service systems (J.Janáček)

2007-2009 – CZ/SK - Design methods for the optimal structure of public service systems (J.Janáček)

2007-2009 - CHINA/SK - Use of simulation techniques to optimize the transport processes in the manufacturing enterprise (N.Adamko)

2007-2008- CHINA/SK - Simulation models of multimodal transport terminal (V. Klima)

2010-2011 - Optimal design of public service systems in conditions of uncertainty (J.Janáček)

# Informatic Decision Support Tools

## Objectives

- Graduates get an advanced knowledge in computer science and this can be applied at different levels of management in software companies, industrial enterprises in the educational system, such as public and private sectors, banking, transport, health, ecology, etc.
- They can design, develop, implement, expand and adapt informatics tools for decision support as part of the superstructure or information systems.
- They achieve combined knowledge particularly in the field of computer science but also of the necessary business systems and economic informatics, which can flexibly adapt labor requirements in these organizations and market requirements, manpower or self employment in the field of informatics and logistics.

# Informatic Decision Support Tools

**Main topics of the study programme**

- Advanced architecture of information systems
  - IS architecture, advanced data structures, database systems, geographic information systems.
- Processes and information management:
  - creation and management information systems, optimization methods in logistics, discrete simulation.
- Social, moral and legal context of the development and use of information systems:
  - social, ethical and professional aspects, security and data protection in information systems.
- Discrete and Applied Mathematics:
  - theory of cryptography, mathematical methods; uncertain information and its processing.
- Research design and thesis in accordance with professional student interests, abilities and prospects of development in specialized fields:
  - requirements analysis and formulation of the problem, solution / project management (part of the research project, thesis), presentation and opposition of the project (part of the research project, thesis).
- Decision support systems:
  - mathematical programming, heuristic methods, economic data and their flows in firms, design and management of service systems, advanced object technology, knowledge systems, e-technology , economics and business management.



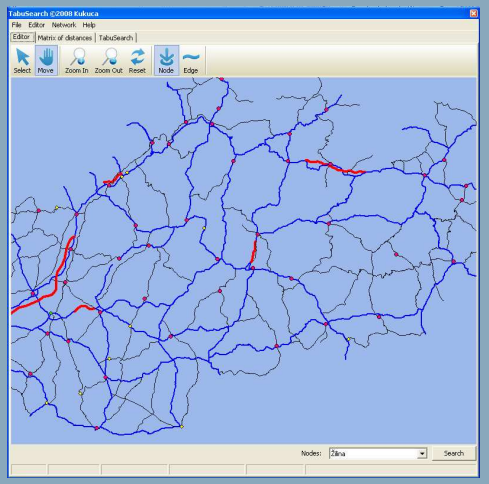


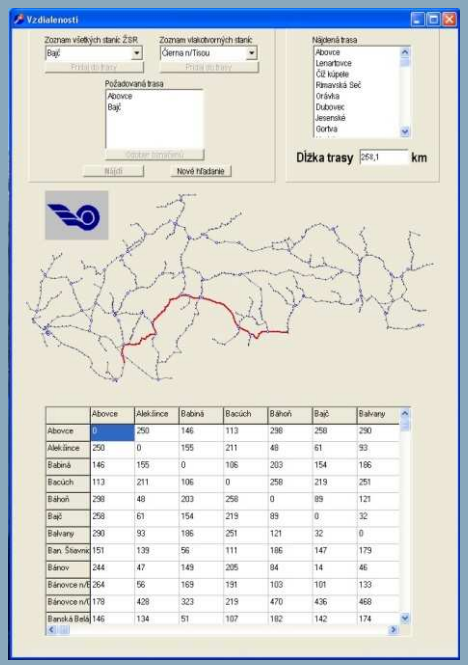
# Informatic Decision Support Tools

## Courses and Study

### *Optimization Techniques*

- Fundamentals of optimization methods
- Advanced optimization techniques
- Theory of fuzzy sets and uncertainty
- Practical examples:
  - Placement of centers for rapid health assistance
  - Location of marshalling yards
  - Optimization of phases at junctions
  - Allocation of stock lines
  - Location of storage, warehouses…



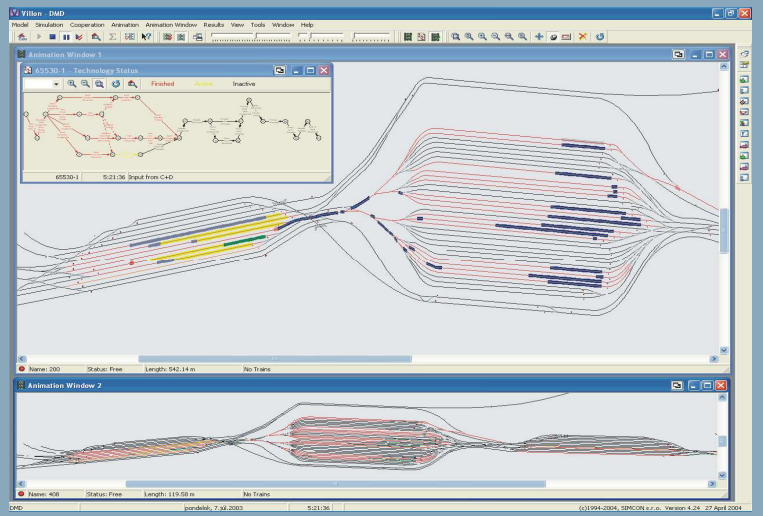



# Informatic Decision Support Tools

## Courses and Study

### *Simulation Techniques*

- Basics of simulation techniques
- Discrete simulation
- Continuous simulation
- Simulation tools







# Informatic Decision Support Tools

## Courses and Study

### *GIS systems*

- basis for optimization and simulation
- digitization (vectorising) data, vectorisation techniques
- forecasting
- analysis of changes