

STUDY PROGRAM: TRAFFIC AND TRANSPORT ENGINEERING

Duration of study program (in years) - 4 (four) years

ECTS - 240

GOALS AND JUSTIFICATION OF THE STUDY PROGRAM

Having in mind the fact that transportation services are significant benchmarkings in the development scheme of a country, their influence on structure and function of social, economic and political systems is direct. This is way it necessary for a traffic engineer to forsee the problems, not only as a planner, an organizer or a designer, but also as traffic and transport expert.

The complexity of problems in contemporary society imposes the need for education personnel in the field of traffic and transport for the purpose of its accelerated development at a global level. Traffic and transport engineers are obliged to respond to numerous requests imposed in then from the field of traffic due to the fact that traffic and transport issue in the last decades become one of the fundamental problems of moder society. For that reason traffic and transport study program in educational sence shoul be viewed as a study program which was developed in answer to the problems encountered in everyday practice. The study program shoul provide the students with the opportunity to substantially understand the fundamentals principles of different areas of traffic and transport, acquire the necessary theoretical and professionally – applicable knowledge for the purpose of getting qualuifucations for solving problems imposed by contemporary society, market and global need for developing sustainable society.

New millennium is marked by massive integration of human systems and technology appliance. In this context, road and transport engineering and experts dericing from this research area would have to undergo changes if the want to integrate in the moder society.

Pricesely in this idea we located the source of our effort to establish updated and modern first cycle of academic studies taught in English.

The Faculty of Technical Sciences - Bitola, Department for Traffic and Transport has defined the primary aims and goals for higher education of competent traffic engineer. The Traffic and Transport Engeeneering study program is designed to ensure the acquisition of competence based on contemporary needs, in which traffic and transport problems are one of the basic barriers to further development.

GENERAL DESCRIPTORS OF QUALIFICATIONS FOR THE STUDY PROGRAM

The general descriptrtors of qualification for the Traffic and Transport engineering study program are listed bellow.

Knowledge and understanding	Displays knowledge and understanding in the field of study which is an upgrade of the previous education and training, including knowledge in the area of theoretical, practical, conceptual, comparative and critical perspectives in accordance with the corresponding methodology; understands and recognizes current issues related to scientific research and
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	new sources of knowledge within the scientific field in question; possesses knowledge and understanding of various theories, methodologies.
Applying knowledge and understanding	Applies knowledge and understanding to the professional approach to work and profession; identifies, analyzes and offers solutions; locates and supports arguments within the frames of the field of study.
Ability assessment	Gathers, analyzes, estimates and presents information, ideas and concepts from relevant data; exercises appropriate judgment taking into account the personal, social, scientific and ethical aspects; combines theory and practice to solve issues, to explain the reasons and to choose an adequate solution.
Communication skills	Communicates and discusses effectively with both professional and non-professional public about information, ideas, issues and solutions as long as the criteria for decision and the scope of the task are clearly defined; takes shared responsibility with regard to collective outcomes; participates independently in specific, scientific and interdisciplinary discussions, showing professional approach.
Learning skills	Takes initiative to identify and address learning needs for further professional education with a high degree of autonomy.

SPECIFIC DESCRIPTORS QUALIFICATIONS FOR THE STUDY PROGRAM

The specific descriptors of qualification for the Traffic and Transport Engineering study program are listed below.

Knowledge and understanding	<ul style="list-style-type: none"> • Applying the theoretical and practical fundamental knowledge of engineering, computer sciences and technologies for transport and traffic engineering activities. • Shows the competencies to describe and discuss about basic and complex traffic and transport tasks. • Possess the ability to follow current scientific researches and developments as well as broader multidimensional concept of the traffic system. • He/she follows a modern tendency of the transport systems development.
Communication skills	<ul style="list-style-type: none"> • Possess the ability for communication through reports and oral presentation, using appropriate terminology from the field of traffic and transport systems • Develops ability to share and discuss with the experts and public community about theoretical and practical issues in the field of traffic and transport systems • Ability for teamwork and active cooperation, by sharing responsibilities and tasks.
Learning skills	<ul style="list-style-type: none"> • Take the initiative to identify the needs for further knowledge acquisition and learning in the area of traffic and transport systems, with a high degree of independence, i.e. estimates of the need for continuous upgrading

	his/her knowledge and skills.
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List of courses

I semester

Mathematics 1 (6 ECTS)

General course objectives:

The students need to have knowledge of basic mathematics which will be able to follow the next mathematical themes, and easier learning to other Scientifics objects, which use mathematics

Learning objectives: To be able of logical thinking, sense of research, forming working habits, systematically, precision and perseverance in work.

Technical mechanics (6 ECTS)

Course objectives: To prepare students to acquire basic knowledge in technical mechanics relevant for graduate engineers in the field of traffic engineering, necessary for further studies.

Acquired competences: The student recognizes and understands the basic principles of technical mechanics. By using literature practically apply existing principles of composition and decomposition of forces in plane and space and apply the conditions of equilibrium in systems with and without friction. Combines theory and practice to calculate the center of gravity of plane section, to calculatate the static values of flat beams, to determine the kinematic values of rectilinear and curvilinear motion of a particle and rigid body. Practically apply the laws of dynamics of material particle and rigid body, with particular emphasis on shocks and collisions. Able to develop and present a project task.

Engineering design and CAD (5 ECTS)

Urbanism and Traffic (6 ECTS)

Study programme objectives: Familiarizing the student with the concept and the basic concepts in urban planning process of urbanization, with the physical and functional structure of the city, the methodology of preparation of urban plans and urban parameters with the dimension and characteristics of the traffic-transport subsystems in cities and their medium (street matrices), and with the tendency of their development as a function of changes in our surroundings.

Obtained competences-knowledge: Sufficiently consistent and useful knowledge in the field of urban planning, that students can apply in practice in team development of planning and design documentation, meaning: to distinguish and define urban functions, morphological elements of a city block and street corridor to distinguished and used urban parameters to compare modes of transport, to know how to argue a comparative analysis of their performance and know how to describe and justify the relationship city-traffic-transport environment.

English language 1 (6 ECTS)

Course objectives:: Acquainting the ESP fundamentals

Obtained competences-knowledge

- Acquainting the basic lexical and grammatical material pertinent to the
- recognition and interpretation of technical terminology
- use of acquired lexical and grammatical material in professional communication and further training

II semester

Mathematics 2 (5 ECTS)

General course objectives:

The students need to have knowledge of basic mathematics which will be able to follow the next mathematical themes, and easier learning to other Scientifics objects, which use mathematics

Learning objectives: To be able of logical thinking, sense of research, forming working habits, systematically, precision and perseverance in work.

Fundamentals of programming and databases (5 ECTS)

Introducing students to the basic concepts of programming and databases. Upon completion of this course, students should understand the basic principles of programming and databases and they should be able to write basic programs and access to databases.

Transport and environment (5 ECTS)

Study program objectives: obtaining knowledge for the main impacts that transport has on the environment, as well as for the measurements and activities directed towards reduction or elimination of those negative impacts.

Competences:

The students will be qualified for:

- identification and study of the impacts that transport has on every aspect of the environment (air, water, noise, waste, climate change, landscape impacts etc.)
- recognition and selection of the ways for assessment of impacts importance and intensity, through the processes of monitoring and modeling
- proposing the measures for reduction of those impacts.

Electronics for traffic engineers (5 ECTS)

Introduction to basic electronic components, principles of operation of basic analog and digital devices and their applications in telecommunications and traffic.

Elective course list - FTS (2/4) (5 ECTS)

Mechanics 2 (5 ECTS)

Course objectives: To prepare students to gain extended knowledge of a rigid body dynamics and material system relevant for graduate engineers in the field of traffic engineering necessary for further studies .

Acquired competences: The student recognizes and understands the complex principles of a rigid body dynamics and material system. By using literature practically applies existing general laws of movement of a rigid body and material system: law for change of the quantity of motion , law for change of the moment of the quantity of motion , a law for change of the kinetic energy, D'alambert principle etc. Uses generalized coordinates to solve the Lagrangian equations to study the movement of a material system. Apply the practical laws of dynamics a of rigid body and material system, with special emphasis on small oscillations in systems with one and two degrees of freedom and oscillations of vehicles. Is able to prepare and present a project work .

Physics (5 ECTS)

The main objective of this course is students to acquire basic knowledge of physical quantities, laws and phenomena of certain areas of physics, which are fundamental for this study program and are necessary for better understanding and learning other subject programs.

Electrical engineering (5 ECTS)

To provide students with basic knowledge of electrical engineering.

English language 2 (5 ECTS)

Course objectives: Acquainting the ESP fundamentals

Obtained competences-knowledge

- Acquainting the basic lexical and grammatical material pertinent to the
- recognition and interpretation of technical terminology
- use of acquired lexical and grammatical material in professional communication and further training

III semester

Statistics and statistical modeling for transport (5 ECTS)

Study programme objectives: To introduce to students the theory of probability and statistics and its application for modelling transport

Obtained competences-knowledge

- Acquainting the knowledge to use statistical methods and models for different applications in transport engineering problems

Motor vehicles 1 (5 ECTS)

Introduction with basis sections of motor vehicle, function of engines with internal combustion and having knowledge of mechanical movement of motor vehicles.

Theory of advanced transport systems (5 ECTS)

To introduce the student with advanced transport systems in freight traffic : types of advanced transportation systems, causes of advanced transport systems , operational assets within the advanced transportation systems , identification of advanced transport systems, as well as advantages and disadvantages of each advanced transport systems, as well as their coordination and cooperation in transport processes in the carriage of goods

Core competencies with which the student is acquired are to recognize the characteristics of advanced transport systems , acquires the ability , knowledge and skill to range the vehicles to perform a specific transport task , as well as work capacity as a multimodal operator , organizer of the transport process .

Traffic Flow Theory (5 ECTS)

Study programme objectives: Presentation of the traffic flow dynamics through the different types of models, as a prerequisite for obtaining the fundamental knowledge which is necessary in the process of planning, construction, maintenance and assessment of road network, according to traffic demand.

Acquired competencies: Adequate application of analytical methods and forming of appropriate tool for successful solving of numerous professional issues, dilemma and problems in the field of traffic and transport

Elective courses list - FTS (2/3) (5 ECTS)

Energy analysis of traffic and transport (5 ECTS)

Introducing students to modern problems especially acute energy problems in traffic and transportation

Street Infrastructure Design (5 ECTS)

Understanding, reading, development, design and presentation of project documentation for different types of traffic solutions in urban planning and design.

Obtained competences-knowledge: Ability to design 3D computer traffic solutions in urban planning and design.

GIS in traffic and transport (5 ECTS)

Introducing students with GIS and possibilities of application of GIS in road traffic

IV semester

Transport economics (5 ECTS)

Explaining the basic principles of transport economics

- Analysis of the demand for transport
- Analysis of the structure of transport costs
- Analysis of the reform of transport policy
- Analysis of market and energy efficiency in transport
- Evaluate the impact on the welfare of prices in transport
- Use patterns Analysis of costs and benefits and economics of well-being
- Arguing about using certain economic models for modeling of transport problems
- Public defense and discussion of the prepared project task.

Traffic management and control techniques (5 ECTS)

General course objectives:

The aim of course is to provide an introductory knowledge to topic related to design of traffic signals, signs and pavement markings

Learning objectives: design of pavement markings, signs, and traffic lights at intersections and road segments, and gaining basic knowledge in traffic project design, intersection performance analysis using SIDRA software (basic level)

Road Infrastructure Design (5 ECTS)

Study programme objectives: Getting knowledge about the basic characteristics of modern, systematic approach in certain phases of road network development.

Acquired competencies: The acquired knowledge and skills according to objectives and content of study programme, are fundamental for forming the competence of the professional profile and successful working in various fields of traffic engineering, as well as highway engineering.

Elective courses list - FTS (2/3) (5 ECTS)

Urban Transport Systems (5 ECTS)

Students are to get familiar with all systems for transport of people in urban areas including different transport modes, their characteristics, system components and their role in the urban transport system.

Obtained competences-knowledge

- This course is an introductory one by nature, that should prepare students for a number of other courses in the latter semesters. Students must know the characteristics of the different modes of urban transport as a basis for planning and design at all three levels of transport planning.

Technical exploitation of motor vehicles (5 ECTS)

Obtaining knowledge for main guide for technical-exploitation characteristics of motor vehicles in real condition of exploitation.

Storage and dispatch of goods (5 ECTS)

To familiarize students with the ways of storing goods , types of warehouses , gaining the ability to create technologies of handling in warehouses , optimization of supplies of goods and management of reserves.

The course is primarily intended as specialized subject upon which more subjects are built from the upper years. Core competencies which acquire student performing tasks in the warehouse on the organization of storage of goods , managing reserves , rationalizing the use of warehouse space, inventory optimization .

V semester

Road freight transport (5 ECTS)

The main objective of this course is students to become familiar with the methods and techniques of planning and management freight transport in national and international level.

Road Traffic safety (5 ECTS)

Familiarizing the students with the basic traffic conditions for normal and safe participation in the traffic. In that sense, it is assumed that the students already know the 3 basic factors of the traffic safety: driver, road and traffic.

Basis on transport planning (5 ECTS)

Getting acquainted with basis of planning namely need and causes of transport planning (Students' ability to form informational basis and participation in transport planning)

Fundamentals of traffic policy (5 ECTS)

To provide students with the knowledge and skills to understand and analyze complex issues and develop transport and conceptualizing advanced and sophisticated solutions for transport policy in the form of regulations, policies and strategies

Elective courses list - FTS (1/3) (5 ECTS)

Models of behavior of traffic participants (5 ECTS)

Students become familiar with the models of behavior of different categories of road users (pedestrians, cyclists, motorcyclists, drivers etc.), which would have acquired the ability to recognize the characteristics of the behavior of each category of participants under certain traffic conditions, and thus be able to propose and take appropriate measures to promote the safety of these categories of participants.

Traffic management and control I (5 ECTS)

General course objectives:

The aim of course is to provide an deeper knowledge to topic related to a comprehensive and integrated approach towards urban traffic management and control for motorized and non motorized transport users

Learning objectives: capability for development and design of road traffic solutions and traffic projects. Design of different types of intersection (three leg, four leg, roundabouts), development of traffic scenarios for road sections and intersections using SIDRA tools (advanced level) and VISSIM microsimulator (basic level). Building of microsimulation model. Model calibration and validation. Analysis of results. Creating an avi presentation

Climate change – impacts and adaptation (5 ECTS)

Study program objective: acquainting the students with transport contribution to the processes of climate change and its effects, as well as with the possibilities for adaptation to the changes.

Competences:

The students will be qualified for:

- research of the climate change impacts, causation and consequences
- development and analysis of the measurements and strategies for adaptation to climate change
- implementation and adaptation.

VI semester

Geodesy (4 ECTS)

Acquiring basic knowledge about geodetic instruments, geodetic recording field, the alignment of roads and situational condition of the concrete road surface

Transport logistics (5 ECTS)

To provide students with the objective concept and the general approach of logistics in the integrated optimization of the transport processes.

Traffic safety management (5 ECTS)

To familiarize students with the methods for analysis and monitoring of traffic safety and to gain the opportunity for analysis and comparison of traffic safety and extracting the necessary conclusions.

Public Transport 1 (5 ECTS)

Students are to get familiar with organization and operational characteristics of the public transport systems.

Obtained competences-knowledge

Students will be able to design public transport service and define its all operational elements base on the knowledge of:

- Type and characteristics of different public transport modes
- Characteristics of travel demand
- Optimal design of timetables
- Measures of productivity and ways to improve it
- Tariff and ticketing systems
- Passenger information systems

Elective courses list - FTS (1/4) (5 ECTS)

Traffic psychology (5 ECTS)

Familiarizing the students with the factor - men, as the main factor for the traffic safety. Sight and the traffic safety. The hearing and the traffic safety. The medical state of the participants and the traffic safety. Liqueur and the traffic safety. Fatigue. Work tiredness. The biorhythm and the traffic accidents. Biological rhythms and the traffic accidents.

Transport logistics (5 ECTS)

Study programme objectives: Introducing the student to the concept, importance, opportunities, risks, and the basic concept of the city logistics strategy, and to learn about the need to introduce measures for planning, modeling and optimization of the performances of micro and meta logistic flows in the cities.

Obtained competences-knowledge: Ability to distinguish between the basic principles of city logistics, defining and analyzing the macro, meta and micro urban logistics performances, selection, design and evaluation of measures and solutions to the problems of city logistics and finally introduction of urban logistics strategy and innovative city logistics concepts for efficient, environmentally friendly and safe management of the city freight flows.

Road Traffic safety 2 (5 ECTS)

To familiarize students with the legislation in the field of traffic safety and the rules for safe participation in the traffic system.

Technical diagnostics traffic and transport (5 ECTS)

Introducing students with impairments, their diagnosis and guidelines for their elimination in the traffic-transport vehicles

A) GROUP: TRAFFIC

VII semesetr

Modeling transport demand (6 ECTS)

Introducing modeling transport demand to students (Students' ability for modeling transport demand)

Intelligent transport systems I (6 ECTS)

General course objectives:

The aim of course is to provide an introductory knowledge and understanding to topic related to intelligent transport systems with emphasis on traffic management and control systems

Learning objectives: ability to distinguish certain sub-areas of intelligent transport systems (ITS) and their design and implementation

Inspection and reconstruction of traffic accidents (6 ECTS)

Familiarizing the students with the need of good traffic accident inspect. Creating the record, sketch and photos from the traffic accident place. Need and conditions for creating traffic accident reconstruction inspect

Elective courses list - FTS (1/3) (5 ECTS)

Software packages in theory of traffic flows (5 ECTS)

Study programme objectives: Introducing the student to the principles of software development and software design, as well as with the basic features, functions and capabilities of software packages for analyzing traffic flows and networks.

Obtained competences-knowledge: The added value for successful project management - ability to identify, selection, creation and implementation of software as a support tool in decision-making at different levels of traffic management.

Simulation of traffic accidents (5 ECTS)

The aim is to familiarize students with software packages for the simulation of accidents and application programs for the development of Sketch from the scene of the accident. Students will gain the ability to use the software package PC CRASH at solving real accidents with knowledge of Corel Draw and Easy Street Draw tool to create a situation plan from the scene of the accident

Road Operations (5 ECTS)

Study programme objectives: Getting knowledge about the various concepts of road operations management.

Acquired competencies: Knowledge and skills for optimal road network development according to certain principles, models and techniques. These competencies are necessary to carry out the various activities in highway engineering enterprises.

VIII semester

Expertise of traffic accidents (6 ECTS)

Study programme objectives (competences): The aim is to familiarize students with the preparation of expert reports and traffic - technical expertise of traffic accidents and take competencies for technical analysis of accidents.

Spatial planning (6 ECTS)

Study programme objectives (competences): Introducing methodology approaches to students for spatial planning as a high level of planning with focus of traffic concept (Students' ability to identify problems with spatial development and introducing methods, to improve the process of physical planning and implementation of theoretical and practical experience with examples of plans)

Elective courses list - FTS (1/3) (5 ECTS)

Intelligent transport systems II (5 ECTS)

Learning objectives: ability to analyzing and resolving traffic situations using ITS systems, designing of ITS systems by applying micro simulation tools (simple and complex traffic situations), development and evaluation of adaptive signal control strategies

General course objectives:

The aim of course is to provide knowledge to topic related to development, design and micro simulations of systems for urban traffic management and control with use of intelligent systems.

Public Transport Planning (5 ECTS)

Study programme objectives: This course is aimed at the methodology for planning of public urban transport, that is a methodology to work out public transport study as a part of general urban transport study or separate one for public transport modes only.

Obtained competences-knowledge

Students will be able to do studies on public transport by knowledge of the methodology for planning, methods for data collection, data analysis, alternative solution generation and evaluation

Road Infrastructure Quality Assessment (5 ECTS)

Study programme objectives: Getting knowledge about the basic procedures for assessment of road network elements, necessary for preparing the various feasibility studies.

Acquired competencies: The results of application the mentioned procedures for assessment, have a key role in the process of creation the road network development.

B) GROUP: TRANSPORT

VII semester

City Logistics (6 ECTS)

Study programme objectives: Introducing the student to the concept, importance, opportunities, risks, and the basic concept of the city logistics strategy, and to learn about the need to introduce measures for planning, modeling and optimization of the performances of micro and meta logistic flows in the cities.

Obtained competences-knowledge: Ability to distinguish between the basic principles of city logistics, defining and analyzing the macro, meta and micro urban logistics performances, selection, design and evaluation of measures and solutions to the problems of city logistics and finally introduction of urban logistics strategy and innovative city logistics concepts for efficient, environmentally friendly and safe management of the city freight flows.

Types of transport technologies (6 ECTS)

Introduce students with different types of transport technologies, which are used in the transportation of goods to identify technological change in the modern transport system, to define the role of the logistics operator when it comes to efficient transport technology, and to understand the role and the importance of different types of transport technologies in the transport system.

The course is primarily intended as specialized subject upon which more courses are built. Core competencies which are acquired student knowledge of the characteristics of each transport technology from different modes of transport as a basis for the organization of the transport process , coordination and cooperation between transport technologies individually , vehicle selection , and the best transport route etc.

Motor vehicles 2 (6 ECTS)

Developing knowledge for constructive and functional characteristics of motor vehicles systems and for theory of motor vehicles movement.

Elective courses list - FTS (1/3) (5 ECTS)

Integrated transport logistics (5 ECTS)

To provide students with the objective concept and the general approach of integrated transport logistics in the integrated optimization, organization and management of this kind of transport processes.

Public Transport 2 (5 ECTS)

Study programme objectives: After the basic knowledge obtained by Public transport 1 course, students should further widen their skills related to the organization, financing and provision of high quality public transport service

Obtained competences-knowledge

Students will be able to manage, organize and optimize the public transport service based on the knowledge of:

- Types and characteristics of different organizational and management schemes
- Problems and types of financing public transport
- Marketing public transport
- Quality of service definition and indicators
- Innovative public transport services

Passenger information systems

Traffic Marketing Management (5 ECTS)

To familiarize students with the basic principles and specific features of marketing management concept.

Acquired competencies: Developing a marketing strategy and participation in promotional campaigns in the field of traffic and transportation.

VIII semester

Efficiency and logistics maintenance of transport vehicles (6 ECTS)

The main objective of this course is students to become familiar with the operational methods and techniques of planning and managing the maintenance of vehicles in terms of logistics.

Technical exploitation of motor vehicles (6 ECTS)

Obtaining knowledge for main guide for technical-exploitation characteristics of motor vehicles in real condition of exploitation.

Elective courses list - FTS (1/2) (5 ECTS)

Public Transport Planning (5 ECTS)

Study programme objectives: This course is aimed at the methodology for planning of public urban transport, that is a methodology to work out public transport study as a part of general urban transport study or separate one for public transport modes only.

Obtained competences-knowledge

Students will be able to do studies on public transport by knowledge of the methodology for planning, methods for data collection, data analysis, alternative solution generation and evaluation

Optimal location of commodity transport hubs (5 ECTS)

To introduce students with the application of the technique of artificial intelligence in solving complex tasks to optimize traffic and transport in the presence of uncertainty, with special emphasis on the choice of location of commodity transport hubs , using Fuzzy systems - modeling stages

The course is primarily intended as specialized subject upon which more subjects are based, when it comes to artificial intelligence. Core competencies which are acquired student knowledge of modeling stages , setting the task , defining the criteria of decision making, valuation of the defined criteria, and an introduction to the whole procedure of calculation and decision.

C) GROUP: TRANSPORT AND ENVIRONMENT

VII semester

Engines with internal combustion and ecology (6 ECTS)

Introduction with basis of engines with internal combustion functional, like ways and measures for exhaust emission cleaning for sustain the quality of the environment air.

Transport and urban pollution (6 ECTS)

Study program objectives: to gain knowledge for air pollution in urban areas, pollution processes and trends as well as for the contribution of transport as a source of urban pollution.

Competences:

The students will be qualified for:

- organizing and analyzing the data for transport and environment
- understanding the interactions and processes related with urban air pollution from transport
- studying the vehicle exhaust emissions, tools and approaches for modeling and monitoring
- practical experience with open-source tools for data analysis and modeling
- air pollution modeling
- identification and assessment of the measures for traffic management and control towards reduction of air pollution.

Economics of Environment (6 ECTS)

The course intends to enable students to analyze the relationship between the economy and the environment - in terms of traffic and transport - from different perspectives: by identifying important problems and issues; learning and applying different methodologies to analyze and solve these problems and issues; by being able to interpret and evaluate the results from different

perspectives; and by being able to identify the pros and cons of various solutions to these problems and issues.

Elective courses list - FTS (1/2) (5 ECTS)

Intelligent transport systems I (5 ECTS)

Learning objectives: ability to analyzing and resolving traffic situations using ITS systems, designing of ITS systems by applying micro simulation tools (simple and complex traffic situations), development and evaluation of adaptive signal control strategies

The aim of course is to provide knowledge to topic related to development, design and micro simulations of systems for urban traffic management and control with use of intelligent systems.

Software packages in theory of traffic flows (5 ECTS)

Study programme objectives: Introducing the student to the principles of software development and software design, as well as with the basic features, functions and capabilities of software packages for analyzing traffic flows and networks.

Obtained competences-knowledge: The added value for successful project management - ability to identify, selection, creation and implementation of software as a support tool in decision-making at different levels of traffic management.

VIII semester

Assessment of traffic impacts upon environment (6 ECTS)

Study program objectives: acquainting the students with the principles and methods for assessment of traffic impacts; identification, description and analysis of the traffic impacts relevant for the environment.

Competences:

Students will be qualified for:

- strategic assessment and environmental assessment: identification of impacts, analysis and prediction, significance
- identification and application of other approaches for impact assessment upon environment and for sustainability assessment, applicable at the level of policy, plan, program and project level critical appraisal of the importance of assessment processes for the promotion of environmental protection and for sustainable development.

Energy and environmental aspects in traffic and transport (6 ECTS)

Introducing students to the functional dependencies between energy systems and traffic-transport systems, consumer spending and the economy in terms of optimization of costs.

Elective courses list - (1/2) (5 ECTS)

Spatial planning (5 ECTS)

Study programme objectives (competences): Introducing methodology approaches to students for spatial planning as a high level of planning with focus of traffic concept (Students' ability to identify problems with spatial development and introducing methods, to improve the process of physical planning and implementation of theoretical and practical experience with examples of plans)

Optimal location of commodity transport hubs (5 ECTS)

To introduce students with the application of the technique of artificial intelligence in solving complex tasks to optimize traffic and transport in the presence of uncertainty, with special emphasis on the choice of location of commodity transport hubs , using Fuzzy systems - modeling stages

The course is primarily intended as specialized subject upon which more subjects are based, when it comes to artificial intelligence. Core competencies which are acquired student knowledge of modeling stages , setting the task , defining the criteria of decision making, valuation of the defined criteria, and an introduction to the whole procedure of calculation and decision.

Road Infrastructure Quality Assessment (5 ECTS)

Study programme objectives: Getting knowledge about the basic procedures for assessment of road network elements, necessary for preparing the various feasibility studies.
Acquired competencies: The results of application the mentioned procedures for assessment, have a key role in the process of creation the road network development.