STUDY MODULE DESCRIPTION FORM

Name of the module/subject **Traffic Engineering**		Code **1010125111010121001**
Field of study **Transportation Engineering Extramural Second-**	Profile of study (general academic, practical) **(brak)**	Year /Semester **1 / 1**
Elective path/specialty **Road Engineering**	Subject offered in: **Polish**	Course (compulsory, elective) **obligatory**
Cycle of study: **Second-cycle studies**	Form of study (full-time,part-time) **part-time**	
No. of hours Lecture: **25** Classes: **-** Laboratory: **-** Project/seminars: **20**		No. of credits **6**
Status of the course in the study program (Basic, major, other) **(brak)**	(university-wide, from another field) **(brak)**	
Education areas and fields of science and art		ECTS distribution (number and %)

Responsible for subject / lecturer:

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Responsible for subject / lecturer:

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Prerequisites in terms of knowledge, skills and social competencies:

1	**Knowledge**	Knowledge from subject Traffic Engineering from engineering (first cycle) studies; Knowledge of street classification; Basic knowledge concerning junctions, street geometry and drive of car and rail vehicles.
2	**Skills**	Ability to use mathematical tools; Ability to calculate vehicle kinematics; Ability to design elements of a simple traffic light; Ability to measure traffic.
3	**Social competencies**	Ability of independent work; Responsibility for solidity of acquired results; Ethic behaviour.

Assumptions and objectives of the course:

Lecture: Acquainting students with advanced important elements of traffic organistation and management theory, including general knowledge about ITS. Teaching students an ability to design with decision support in planning and design.

Project: Teach to design a simple coordinated traffic light, including intergreen times calculations. Teach basics of traffic control based on block system.

Study outcomes and reference to the educational results for a field of study

Knowledge:

1. Has knowledge about optimisation of given transport network - [K_W09]
2. Knows codes and rules governing design of traffic lights, - [K_W14]
3. Knows how to shape street geometry and traffic management according to traffic engineering principles. - [K_W16]

Skills:

1. Can classify and evaluate quality of a given ITS implementation, - [K_U02]
2. Can design traffic lights according to rules of sustainable developement and energy consumption reduction, - [K_U08]
3. Can choose optimaln tools for management of traffic on junctions. - [K_U13]

Social competencies:

1. Is concious about a need for sustainable transport, - [K_K04]
2. Can formulate opinions concerning traffic management, - [K_K07]
3. Takes care about own health and physical fitness by using modes of transport alternative to the car. - [K_K13]

Assessment methods of study outcomes

Lecture: During one of the last two weeks a seminar takes place during the lectures with a scope of problems for discussion. Students discuss these problems, their arguments being evaluated binary. The grade for the lecture depends on the acquired number of points. Students that did not reach the limit are subject to an oral colloquium in 3-4 person groups ? they have to show basic knowledge in all 4 traffic engineering topics: traffic description, traffic management, public transport, transport network design and traffic modelling.

Project ? accomplishment of tasks with the tasks? defence.

Course description

Lectures:

1. Time, distance and energy in transport.; advances in microeconomical model and structure of cost in transport. Value of time. Optimisation problems of transport developments.

2. Market structure of space (Christaller?s theory). Elements of social geography in identification of inhabitant?s structure. Modelling of spatial social structures. Energy and modal split in urbanised areas.

3. Traffic congestion. Influence of spatial structure, transport and financial dependencies. Instruments for regulation of congested states of traffic. Traffic management in Buchanan?s networks.

4. Traffic management in congested networks. Optimal cycle and border conditions. Micro and macro simulation in optimisation processes. Systems for traffic management, detection and data transmission. Public transport priority. Criteria and effectiveness of traffic management.

5. Intelligent traffic systems (ITS). System?s components and functional areas. Local and central control. Design of ITS architecture.

6. Gravitation model. Overview of theory development up to structure of a termodynamical traffic distribution model. Motivated distribution. Spatial drag function in motivated distribution. Modification and actualisation of O-D Matrix.

7. Modelling of traffic distribution in a network. Iteration techniques and modifications for online prognosis in ITS architecture. Information systems (travel planners, variable message signs).

8. Public transport. Modal optimisation and optimisation of timetables. Accessibility and interactivity measures. Integrated interchanges. Agglomeration systems. Fast public transport. BRT as an alternative to rail transport.

9. Parking. Basic measures. System structure of parking organisation and infrastructure. ITS in parking systems. Parking policy.

10. Traffic management. Criteria and methods. Pedestrian and bicycle traffic, traffic environment. Traffic calming.

11. Traffic safety. Traffic safety research and methods for reducing traffic risk. Programme Gambit and Vision Zero as exemplary projects for improving traffic safety. Motor culture and consciousness.

Project:

Design of a coordinated traffic light for a junction, including intergreen time calculations.

Basic bibliography:

1. Steenbrinc P.A.: Optymalizacja sieci transportowych. WKiŁ, Warszawa 1978.
2. Gaca S., Suchorzewski W., Tracz M.: Wybrane problemy inżynierii ruchu. WKiŁ, Warszawa 2008.
3. Podoski J.: Komunikacja miejska. WKiŁ, Warszawa 1978.

Additional bibliography:

1. Szczuraszek T.: Bezpieczeństwo ruchu miejskiego. WKiŁ, Warszawa 2005.
2. Woch J.: Narzędzia analizy efektywności i optymalizacji sieci kolejowej. WPŚl., Gliwice 2001.
3. Transport Miejski i Regionalny, Stowarzyszenie Inżynierów i Techników Komunikacji Rzeczpospolitej Polskiej, Warszawa.
4. Przegląd Komunikacyjny, Stowarzyszenie Inżynierów i Techników Komunikacji Rzeczpospolitej Polskiej, Warszawa.
5. Proceedings of a cyclic conference: Problemy komunikacyjne miast w warunkach zatłoczenia motoryzacyjnego

Result of average student's workload

Activity	Time (working hours)
1. Student?s attendance to lectures and projects	34
2. Preparation to the exam	20
3. Consulting.	26
4. Designing project outside classrooms	50
5. Literature survey	20

Student's workload

Source of workload	hours	ECTS
Total workload	150	6

Contact hours	55	2
Practical activities	80	3