POLYTECHNIC OF RIJEKA
TRANSPORT DEPARTMENT

PROGRAMME OF STUDY

PROFESSIONAL STUDY OF
ROAD TRANSPORT, RAIL TRANSPORT AND POSTAL SERVICES

- **LIST OF COURSES**

Professional Study of Road Transport

1st year of study – Semester I (Winter Semester)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
1	Mathematics	4	-	3	-	8	1
58	Introduction into Marketing	2	1	0	-	4	1
3	Graphic Communications	2	-	2	-	5	1
4	Informatics Fundamentals	2	-	3	-	5	1
5	Knowledge of Commodities	2	1	-	-	5	1
6	Foreign Language I	2	-	1	-	3	1
7	Physical Education			(2)			
	Total / semester	**14**	**2**	**9 (11)**	**-**	**30**	**6**

Note: 1) L – lecture, S – seminar, E – exercise, P – practical
2) Students can choose one of the following foreign languages: English, German or Italian
3) Physical Education is performed out of time-table

1st year of study – Semester II (Summer Semester)

Course unit no.	The title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
8	Transport and Regional Planning	2	1	-	-	4	1
9	Advanced Transportation Systems	2	2	-	-	6	1
10	Basics of Electrical Engineering and Electronics	2	-	2	-	5	1
11	Statistics in Transport	2	-	1	-	4	1
12	Foreign Language II	2	-	1	-	4	1
24	Economics Fundamentals	2	2	-	-	4	1
14	Transport and Ecology	2	1	-		3	1
7	Physical Education			(2)			
	Total / Semester	**14**	**6**	**4 (6)**	**-**	**30**	**7**

2nd year of study – Semester III (Winter Semester)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
15	Engineering Mechanics	3	-	2	-	6	1
60	Reloading Devices	2	1	1	-	5	1
17	In-house Transport and Storage	2	-	2	-	4	1
26	Transport Law	2	1	-	-	4	1
19	Transport Corridors and the Flow of Goods	2	2	-	-	4	1
13	Fundamentals of Mechanical Engineering	2	-	1	-	4	1
21	Foreign Language III	1	-	2	-	3	1
	Total / Semester	**14**	**4**	**8**	**-**	**30**	**7**

2nd year of study – Semester IV (Summer Semester)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
59	Planning and Managing Sustainable Transport	2	2	-	-	4	1
23	Goods-distribution Centers and Terminals	2	2	-	-	5	1
20	Transport Logistics	2	1	-	-	4	1
25	Management Fundamentals	2	1	-	-	4	1
18	Operational Research in Transport	2	-	1	-	4	1
27	Urban Public Transport Technology and Organization	2	1	-	-	4	1
28	Foreign Language IV	1	-	2	-	3	1
29	On-the-job professional summer training – 1 month				(x)	2	
	Total / Semester	**13**	**6**	**4**	**(x)**	**30**	**7**

3rd year of study – Semester V (Winter Semester)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
30	Road Transport Infrastructure	2	1	-	-	3	1
31	Means of Road Transport and their Exploitation	2	-	2	-	5	1
32	Technology and Organization of the Road Transport	2	2	-	-	4	1
33	Road Transport Safety with Traffic Accidents Expertise	2	-	1	-	4	1
34	Traffic Engineering	2	-	1	-	4	1
35	Information Systems in Road Transport	1	-	2	-	3	1
36	Road Transport Economics	2	1	-	-	4	1
	Elective subject*	2	1	-	-	3	1
	Total / Semester	**15**	**5**	**5**	**-**	**30**	**8**

*Elective subjects (a student chooses one of the following):

57 Human Resources in Transport

61 Methodology Fundamentals of Professional and Scientific Papers

3rd year of study – Semester VI (Summer Semester)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
37	Semestral Practical Professional Training	-	-	-	(x)	13	-
38	Graduation Thesis	-	-	(x)	-	17	1
	Total / Semester	**-**	**-**	**(x)**	**(x)**	**30**	**1**

Professional Study of the Rail Transport

3rd year of study – Semester V (Winter Semester)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
39	Rail Transport Infrastructure	1	1	-	-	3	1
40	Rolling Stock and Train Hauling	2	-	1	-	4	1
41	Technology and Organization of the Rail Transport	3	2	-	-	6	1
42	Signalling and Automation in Rail Transport	2	-	1	-	4	1
43	Rail Transport Safety	2	-	1	-	4	1
44	Information Systems in Rail Transport	1	-	2	-	3	1
45	Rail Transport Economics	2	1	-	-	3	1
	Elective subject A*						
	Total / Semester	**15**	**5**	**5**	**-**	**30**	**8**

*Elective subjects (a student chooses one of the following):

57 Human Resources in Transport
61. Methodology Fundamentals of Professional and Scientific Papers

3rd year of study – Semester VI (Summer Semester)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
37	Semestral Practical Professional Training	-	-	-	(x)	13	-
38	Graduation Thesis	-	-	(x)	-	17	1
	Total / Semester	**-**	**-**	**(x)**	**(x)**	**30**	**1**

Professional Study of the Postal Services

3rd year of study – Semester V (Winter Semster)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
46	Postal Services Infrastructure	2	1	-	-	3	1
47	Postal Services Technology and Organization	3	1	-	-	4	1
48	Postal Payment Services	2	-	1	-	4	1
49	Postal Services Information Systems	1	-	2	-	3	1
50	Postal Services Network Planning	2	1		-	5	1
51	Postal Services Economics	2	1	-	-	4	1
52	Postal Services Technical Facilities	1	-	2	-	4	1
	Elective subject A*	2	1	-	-	3	1
	Total / Semester	**15**	**5**	**5**	**-**	**30**	**8**

*Elective subjects (a student chooses one of the following):

57 Human Resources in Transport

61. Methodology Fundamentals of Professional and Scientific Papers

3rd year of study – Semester VI (Summer Semester)

Course unit no.	Title of the course unit	Hours weekly				ECTS credits	Exam
		L	S	E	P		
37	Semestral Practical Professional Training	-	-	-	(x)	13	-
38	Graduation Thesis	-	-	(x)	-	17	1
	Total / Semester	**-**	**-**	**(x)**	**(x)**	**30**	**1**

Entire programme of Professional Studies of Road Transport, Rail Transport and Postal Services – total:

Semester	Hours / Semester					ECTS credits	Exam
	L	S	E	P	Total		
Semester I	195	30	150	-	375	30	6
Semester II	210	60	75	-	345	30	7
Semester III	210	60	105	-	375	30	7
Semester IV	195	135	45	-	375	30	7
Semester V	225	75	75	-	375	30	8
Semester VI	-	-	(x)	(x)	-	30	1
Total at the study	**1050**	**345**	**450**	**(x)**	**1845**	**180**	**36**

During studies a student attends 1845 hours. By fulfilling all the study obligations a student is awarded a total of 180 ECTS credits.

COURSE DESCRIPTION OF PROFESSIONAL STUDIES OF TRANSPORT

MATHEMATICS | **Course unit number: 1**

Hours weekly: 4+0+3+0/I | **ECTS credits: 8**

Syllabus outline

Sets and number sets N, Z, Q,R, C. Notion of a matrix and some special forms of matrices. Mathematical operations with matrices determinants. Linear equations systems. Presentation of the system in the matrix form. Methods of system solving and conditions of solubility. Definition of vectors. Addition and subtraction of vectors. Multiplying of vectors by a scalar. Vectors in rectangular co-ordinate system. Scalar, vector and mixed product of multiplication of vectors. Notion of a function. Composition of functions. Inversion function. Basic functions and their graphic presentation. Notion of a series .Boundary value of a series. Convergence and divergence. Boundary value and continuity of a function. Definition of derivation. Geometric and kinematical meaning of derivation. Differential of a function. Rules of derivation. Derivations of basic functions. Derivations of higher level. L'Hospital's Rule. Extreme values of a function and application. Definition and features of undefined integral. Integration methods. The notion of a defined integral. Connection between defined and undefined integral. Application of defined integral.

Developing general and specific competence (knowledge and skills)

By realization of the programme, a student acquires the contents of the course. The accent is on the developing of ability for logical concluding and analytical reasoning at solving problem exercises, as well as accuracy in calculation and expression of mathematical facts.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

INTRODUCTION INTO MARKETING	**Course unit number 58**
Hours weekly: 2+1+0+0/I	**ECTS credits: 4**

Syllabus outline

The concept of maketing, basic terminology, evolution of the concept. The term and dimension of the market. Basic marketing functions. Marketing environment; external and itnernal environment. Information technology systems in marketing. A process and methods of market reseach. Customer behaviour; characteristics and factors of customer behaviour. Market segmentation, predictions and positioning. Product politics. Price politics. Distribution and logistics. Promotion politics. Planning, organizing and control of marketing activities.

Developing general and specific competence (knowledge and skills)

By taking the exam, students gain knowledge about the possibilities of marketing application in different economic activities, the influence of the implementation of a marketing concept on business success at micro level and on the entire economical and social development. The following activities are developed: problem analysis, logical reasoning and creative thinking when addressing problem tasks in logistics.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

GRAPHIC COMMUMICATIONS | **Course unit number: 3**

Hours weekly: 2+0+2+0 / I **ECTS credits: 5**

Syllabus outline

Elements of graphic communications. About normization and norms. Orthogonal projection and axonometrics. Displaying of technical objects (sections, hatching, peculiarities and simplification in drawing). Dimensioning. Standard numbers. Surface roughness. Tolerances and fits (tolerances of a segment of a line and of angles, shape and position tolerances, ISO tolerance system). The use of a computer in technical documentation working out (basics of CAD).

Developing of general and specific competence (knowledge and skills)

Introduction to and mastering of fundamental knowledge regarding graphic communications.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

INFORMATICS FUNDAMENTALS | **Course unit number: 4**

Hours weekly: 2+0+3+0 / I **ECTS credits: 5**

Syllabus outline

Informatics. Information. Information society. Informatics technology. Computer. Software. Communications. Organization and information. Notion of a system. System theory. Theory of organization, management and decision making, models. Information system. Expert systems. Data processing development. Computer systems and their development. Choice of hardware. Mathematical and logical basics of computer. Data presentation and organization. Redundancy. Computer operating software. Choice of software. Computer networks. Multimedia. Information system safety. User information systems. Windows, Word, Excel Access, Corel DRAW and Internet.

Developing of general and specific competence (knowledge and skills)

Acquisition of knowledge regarding basic informatics notions and their meaning. Through exercises the students will learn Windows, Word, Excel, Access and Internet.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

KNOWLEDGE OF COMMODITIES | **Course unit number: 5**

Hours weekly: 2+1+0+0 / I **ECTS credits: 5**

Syllabus outline

Notion and definition of a product. Product-commodity design. Product-commodity classification. Product identification after EAN system. Normization of commodities and standards. Quality of commodities. Quality system ISO 9000. Packing material. Packing of commodities. Storage of commodities. Transport of commodities. Hazardous products (substances). Perishable products. Ecological acceptance of products and processes. Sustainable development. Normization in environment protection. Strategic commodities in the world market – raw materials, semi-finished goods, finished products. Fuel types. Coal, oil, gas. Oil industry products. Polymer materials. Cereals. Products that should be cooled. Commodities on pallets. Commodities in containers.

Developing of general and specific competence (knowledge and skills)

Familiarizing with properties, features and specific qualities of particular types of commodities. Recent knowledge in the field of identification, normization, quality, handling and storage of goods, and ecological acceptance of goods. Strategic goods in the market. Materials in industry and transport.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

THE ENGLISH LANGUAGE I | **Course unit number: 6**

Hours weekly: 2+0+1+0 / I **ECTS credits: 3**

Syllabus outline

Introduction of the vocabulary related to transport: Trouble with a car, Let's catch the train, In the train, Travelling by tube, Travelling, About cars in general, The engine of a car, Road traffic regulations, Air pollution problem, Fitness to drive, Types of drivers, Driver and traffic safety education in the USA, Accident reporting.
Grammar: singular and plural of nouns, definite and indefinite article, omission of the article, personal pronouns (subjective case and objective case), possessive adjectives and possessive pronouns, reflexive pronouns, all the past, present and future tenses
Business correspondence: The form of a letter, the layout, types of business letters

Developing general and specific competence (knowledge and skills)

Mastering of the fundamental vocabulary related to road transport, rail transport and posatl services. Practical and correct use of all the tenses, articles, personal pronouns, possessives and reflexive pronouns both orally and in written form. Familiarizing with the basic elements of a business letter.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

THE GERMAN LANGUAGE I

Course unit number: 6

Hours weekly: 2+0+1+0 / I

ECTS credits: 3

Syllabus outline

Introduction of the vocabulary related to transport: Travelling abroad, International vehicle insurance, Transport safety, Speed limitation, Alcohol and driving, Advice in case of accident, Railways. Postal service. Window service. Mail delivery. Letters and stamps.
Grammar: Present. Modal verbs. Types of verbs. Pronouns. Imperative. Articles and declination.
Business correspondence: : The form of a letter, the layout, types of business letters

Developing of general and specific competence (knowledge and skills)

Mastering of the fundamental vocabulary related to road transport, rail transport and posatl services. Practical and correct use of present, imperative, articles, all types of pronouns, both orally and in written form. Familiarizing with the basic elements of a business letter.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

PHYSICAL EDUCATION | **Course unit number: 7**

Hours weekly: 0+0+2+0 / I, 0+0+2+0 / II **ECTS credits: -**

Syllabus outline

Classes are held in fitness center and as outdoor running exercises (cross country).
Through exercises students become aware of the importance of regular exercising.
Students also acquire basic information about physical education which has great influence on general heath, on capacity for work and defense mechanisms.
The above mentioned elements influence the development of functional and motoric ability as well as conative and cognitive characteristics of the human body.

Developing of general and specific competence (knowledge and skills)

Students gain knowledge and develop skills in physical education to satisfy biological and psychosocial need for movement.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

TRANSPORT AND REGIONAL PLANNING | **Course unit number: 8**

Hours weekly: 2+1+0+0 / II **ECTS credits: 4**

Syllabus outline

Basic notions, definitions and terminology, laws, regulations and institutions concerning transport and regional planning. Relationship between transport and regional planning.
Methodology of designing of transport and regional plans. Components of transport and regional plans.
International aspects of transport and regional planning.
Features of towns, regions and other areas: development, factors, areas structuring, central settlements and development corridors system.

Developing of general and specific competence (knowledge and skills)

Introduction to theory and practice of transport and regional planning and standard types of transport-regional documentation, in order to make transport engineers capable of understanding the relationship between transport and processes of regional planning.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

ADVANCED TRANSPORTATION SYSTEMS | **Course unit number: 9**

Hours weekly: 2+2+0+0 / II **ECTS credits: 6**

Syllabus outline

Transport in the theory of a system. Transport systems elements – vertically and horizontally. Historical development of transport. Marine transport. Road transport. Rail transport. Air transport. Postal services. Telecommunications. River transport. Canal transport. Pipeline transport. Cable-way transport. Urban traffic. Sea ports. Important items of transport system. Integral transport, palletization, containerization. Combined transport. Multimodal transport. RO-RO transport, LASH transport technology, Huckepack transport technology, bimodal transport technologies.

Developing of general and specific competence (knowledge and skills)

Familiarizing with the structure of transport system. Theoretical and professional competence related to the basics of particular transport branches. Introduction to the advantages of modern transportation systems. Joining of particular transport subsystems in a transportation chain. Modern transportation systems functioning in the Republic of Croatia an in the World.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

BASICS OF ELECTRICAL ENGINEERING AND ELECTRONICS | **Course unit number: 10**

Hours weekly: 2+0+2+0 / II **ECTS credits: 5**

Syllabus outline

Electic charges, force, field, capacity. Electric influence. Electric potential energy. Electric potencial. Voltage. Condensers. Connecting of condensers. Electrical field energy. Electric current: Intensity. Density. Electric resistance. Dependence of resistance on temperature. Voltage sources. Electromagnetic force. Work and strength of electric current. Resistors. Electric current magnetic field. Magnetic induction and flow. Permeability. Conductors in magnetic field. Impact of electric current on electric current. Electromagnetic induction. Alternate current: Indicated value. Electric circuits. Jet resistances. Resonance in alternate electric circuit. Alternate current strength and energy. Three-phase system. Transformers. Pn diodes. Transformers. Voltage regulators. Transistors. Basic amplifying connections with transistors. Tiristors. Basic converting connections with power components. Linear integrated assemblies. Basic amplifying connections with linear integrated assemblies.

Developing of general and specific competence (knowledge and skills)

Introduction to and mastering of basic knowledge regarding electrical engineering and electronics.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

STATISTICS IN TRANSPORT | **Course unit number: 11**

Hours weekly: 2+0+1+0 / II **ECTS credits: 4**

Syllabus outline

Introduction with descriptive statistical analysis. Basic terms. Statistical data. Data ordering. Tabulation. Statistical graphics. Relative numbers. Analysis of numerical series by methods of descriptive statistics. Middle values. Dispersion measures. Asymmetry measures. Roundness measures. Sampling method. Parameters assessment (arithmetic mean, total and proportions of a basic set). Testing of hypothesis of arithmetic mean and proportions of a basic set. Fundamentals of regression and correlation analysis. Simple linear regression model. Simple linear correlation model. Scatter diagram. Sperman's coefficient of rank correlation. Basic analysis of time series. Definition of time series. Graphic presentation and comparison of time series. Dynamics indices. Individual indices (chain and basic indices). Joint indices. Linear trend model.

Developing of general and specific competence (knowledge and skills)

General competence: mastering of theory and skill in calculation of statistical parameters. Specific competence: capability of exploring on the spot, analyzing of collected data, explaining of calculated indices and using statistical software.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

THE ENGLISH LANGUAGE II | **Course unit number: 12**

Hours weekly: 2+0+1+0 / II **ECTS credits: 4**

Syllabus outline

Topics for broadening of vocabulary relating to transport: Car's anatomy, Traffic management, Traffic control, Train service in Europe, Hovercraft, Hovertrains, , Steam cars, The post office and human progress, Postal services, The air mail, Climate and telecommunications, Communications satellites.
Grammar: adjectives, comparison of adjectives, adverbs, formation of adverbs, modal verbs, Reported Speech with the introductory verb in present (statements, questions, commands and prohibitions).
Business correspondence: writing letters on business situations: import inquiry, domestic inquiry, export inquiry, personal inquiry; Employment – application, curriculum vitae, confirming employment, contract of employment, giving notice, letter of recommendation.

Developing of general and specific competence (knowledge and skills)

Broadening of vocabulary related to road transport, rail transport and postal services. Correct comparison of adjectives, formation and use of adverbs, use of modal verbs, reporting in present. Writing of various types of business letters. Writing of a curriculum vitae.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

THE GERMAN LANGUAGE II | **Course unit number: 12**

Hours weekly: 2+0+1+0 / II **ECTS credits: 4**

Syllabus outline

Topics for broadening of vocabulary relating to transport: Car's anatomy, Traffic management, Traffic control, Train service in Europe, Hovercraft, Hovertrains, , Steam cars, The post office and human progress, Postal services, The air mail, Climate and telecommunications, Communications satellites.
Grammar: adjectives, comparison of adjectives, adverbs, formation of adverbs, Perfect, Preterite
Business correspondence: writing letters on business situations: import inquiry, domestic inquiry, export inquiry, personal inquiry; Employment – application, curriculum vitae, confirming employment, contract of employment, giving notice, letter of recommendation.

Developing of general and specific competence (knowledge and skills)

Broadening of vocabulary related to road transport, rail transport and postal services. Correct comparison of adjectives, formation and use of adverbs, use of Perfect and Preterite. Writing of various types of business letters. Writing of a curriculum vitae.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

ECONOMICS FUNDAMENTALS | **Course unit number: 24**

Hours weekly: 2+2+0+0 / II **ECTS credits: 4**

Syllabus outline

Supply and demand basic elements. Supply and demand on particular markets. Demand and consumers' behaviour. Production and corporate organization. Corporate flexibility and adaptability; horizontal corporation; strategic management and flexibility and adaptability; Cost analysis. Supply and pricing on entirely competitive markets. Income margin and monopoly. Oligopoly and monopolistic competition. Natural resources and capital; Incomes and production factor pricing. Wages and labour market. Expenditure and investments. Aggregate supply and demand fundamentals. Multiplier model. Money and commercial banking. Economic situation cycles and unemployment rate. Inflation and employment rate. Fiscal policy, deficit and national indebtedness. Foreign trade. Business environment consequences and changes affected by scientific and technological revolution; Global competitiveness; Competitiveness factors in global market; Market globalization and company situation.

Developing of general and specific competence (knowledge and skills)

Familiarization with fundamental economic knowledge and patterns.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

TRANSPORT AND ECOLOGY | **Course unit number: 14**

Hours weekly: 2+1+0+0 / II **ECTS credits: 3**

Syllabus outline

Ecosystem, biosphere, biodiversity, food chain. Ecological factors – ecological minimum, maximum, optimum, ecological valency. Biotic ecological factors; species interactions. Abiotic ecological factors: physical, chemical, biological. Influence of traffic on environment: influence on biodiversity; pollution: types of pollution. Physical factors; electromagnetic radiation, warmth, thermal indexes, noise and vibrations. Chemical factors; types of noxious chemicals in environment – classification, mechanisms and effects. Toxicants, mutagenes, cancerogenes, theratogenes. Noxious gasses and vapours. Traffic and settlement ecology; influence of traffic on quality of air, water, ground; influence on life quality. Transport of dangerous substances. Global and climate issues; climate changes, thermal pollution, global warming, greenhouse gasses and "greenhouse effect", stratospheric ozone layer and ozone-depleting substances; far reaching excessive air pollutions. Traffic and sustainable development.

Developing of general and specific competence (knowledge and skills)

Introduction to ecosystem functioning and to global ecologic problems. Capability to detect harmful influence of transport on the environment. Preventive measures. Capability to see road transport, rail transport and postal services in the context of sustainable development.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

ENGINEERING MECHANICS | **Course unit number: 15**

Hours weekly: 3+0+2+0 / III **ECTS credits: 6**

Syllabus outline

Introduction. Statics axioms. Force systems. Moment of a force. Momentum of a couple of forces. Resultant determining. Equilibrium conditions. Center of gravity. Papus-Guldin theorems. Friction. Supports.
Introduction to kinematics. Basic ISO units of measure. Co-ordinate systems. Rectilinear motion (velocity, acceleration). Uniform motion. Uniform variable motion. Harmonic motion. Circular motion. Relative motion. Kinematics of a rigid body. Translation motion. Rotary motion.
Dynamics of a material particle. Newton's laws. Inertial forces. D'Alamber's principle. Amount of motion. Mechanical operating. Kinetic momentum. Potential energy. Kinetic energy. Power. Machine power. Degree of a machine efficiency. Dynamics of a rigid body. Translation motion. Rotary motion. System center motion. Collision.

Developing general and specific competence (knowledge and skills)

Introduction to basic principles of mechanics: statics, kinematics and dynamics. Application of the new knowledge at solving the adequate problems.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

RELOADING DEVICES **Course unit number 60**

Hours weekly: 2+1+1+0/III **ECTS credits: 5**

Syllabus outline

Basics of transhipment mechanization: place and role of transhipment mechanisation, classification and physical-technical features of goods, clasification of transhipment mechanization, effectiveness of means of transhipment. Conveyors – basic forms, building elements, budget:belt conveyors, roller conveyors,scraping coveyors, , screw conveyors, gravity conveyors, pneumatic conveyors, vibrating conveyors, hydraulic conveyor. Derricks operating permanently – elevators. Coneyors.

Transhipment mechanization with sporadic operation and its effects, classification and efficiency. Derricks: basic parameters and machine category. Derrick elements; classification, purpose, durability and budget: cords and wire ropes, wire and plastic bands, chains, hooks, clevis fastener, beams and pliers. Electromagnetic, pneumatic and fork-like grabbers: building elements and purpose. A grab: types and building elements. Chain lockers and drums: types and application. Blocks: types, application, purpose. Stoppers: types and application. Brakes: types, building elements and budget. Wheels: types and budget. Drive of transhipment vehicles. Small and large derricks: types, building elements, application and budget. Universal hand-operated vehicles: types and application. Fork lifts and loaders: types, building elements and budget. Small haul vehicles and trailers: types. Robots. Pallets and containers; types, application, budget.

Developing general and specific competence (knowledge and skills)

Familiarizing with manipulation, ways of building, application areas and advantages and disadvantages of certain transport means with continuous operation. Mastering the methods of a budget of important exploitation sizes. Familairizing with the criteria and a choice technique in accordance with its purpose. Familiarizing with derrick sizes, an element of material grabbing, tran sport devices and their elements of installation and application.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

IN-HOUSE TRANSPORT AND STORAGE | **Course unit number: 17**

Hours weekly: 2+0+2+0 / III **ECTS credits: 4**

Syllabus outline

Notion of in-house transport and storage. Technical-technological parameters of in-house transport. Analysis of processes and flow of goods. Interdependance of in-house and external transport and storage. Notion, structure and function of a warehouse: types, construction and purpose of a warehouse and identifying of warehousing requirements and capacity. Handling of goods and organization of in-house transport and storage processes in manufacturing and transport enterprises. Automation of in-house transport and storage processes. Influence of enterprise process of production or services on the choice if in-house transport and storage. In-house planning and designing. Specific traits of in-hose transport in production and distribution centers. Mathematical models for selection of the most favorable choice of in-house transport and for analyzing the efficiency of its functioning.

Developing of general and specific competence (knowledge and skills)

Familiarizing with basic features of in-house transport and storage and their application to transport and production systems. Planning of technological processes and operational organization of in-house transport. Calculation of physical and financial indicators after the planned technological designs.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

TRANSPORT LAW | **Course unit number: 26**

Hours weekly: 2+1+0+0 / IV **ECTS credits: 4**

Syllabus outline

Term meaning and law elements. Law and related terms. Legal subjects. Legal relations. Term meaning, development and significance of the traffic and transport law. Transport law sources. Transport organization forms. Major national and multilateral sources of transport law (specifically: maritime, road, railway, air transport, and postal service law). Term meaning and types of the transport of goods and passengers contract. Essential and non essential elements of the transport of goods contract. The transport of goods contract concluding methods. The transport of goods covenant parties. Liabilities, rights and responsibilities of the transport of goods covenant parties. Multimodal transport law fundamentals. Forwarding law fundamentals. Transport insurance law fundamentals. Incoterms.

Developing of general and specific competence (knowledge and skills)

Familiarization with and acquiring basic knowledge on transport law.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

TRANSPORT CORRIDORS AND FLOW OF GOODS | **Course unit number: 19**

Hours weekly: 2+2+0+0 / III **ECTS credits: 4**

Syllabus outline

Main international traffic corridors; World maritime trade; International exchange of commodities; Main exporters of strategic raw materials and main shipping routes; Pan-European traffic corridors; Linking of the European North and South; White Paper of the European Union; Position of the Republic of Croatia in terms of geotraffic; Transport development strategy of the Republic of Croatia; Basic traffic corridors in Croatia; World containerization development; Ports as a system.

Developing of general and specific competence (knowledge and skills)

Getting acquainted with the structure and dynamics of the domestic and international goods flow ; Getting briefed on the international maritime trade and ports; Getting acquainted with ports as a system; Getting acquainted with the world and pan-European transport corridors; Getting briefed on the European Union's White Paper.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

FUNDAMENTALS OF MECHANICAL ENGINEERING | **Course unit number: 13**

Hours weekly: 2+0+1+0 / III **ECTS credits: 4**

Syllabus outline

Structure of matter. Mechanical properties of materials. Basic materials in mechanical engineering. Basic testing of materials. Basic procedures and improvements of technical features. Possibility of application of particular materials in engineering. Basic and complex loads. Encumberability of machine components. Strain fundamentals: tension, pressure, bending stress, torsion and buckling strain. Material deformation. Overall and complex strains. Fatigue of material. Strain concentration. Admissible strain. Structural parts: Containers under pressure and pipelines. Welded, soldered, pasted and riveted joints. Bolted joints, bolts, pins, wedges and binding joints. Springs. Sliding and roll bearings. Power gearings: toothed gearings, frictional gearings, clutches, Cardan joints and axes.

Developing of general and specific competence (knowledge and skills)

Introduction to materials in mechanical engineering and their mprovement. Familiarizing with admissible encumberability of particular components regarding strain. Untroduction to machine components.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

THE ENGLISH LANGUAGE III | **Course unit number: 21**

Hours weekly: 1+0+2+0 / III **ECTS credits: 3**

Syllabus outline

Topics for broadening of vocabulary relating to transport:
Britain's roads, Roads and the church, Trading conditions, Road legislation, Early carriages, Evolution of the railway, The world of transport, Tecnology and relationship between transport and communications, Highway safety improvement, Technological development of the automobile, Public transport, Urban public transport, Technological advances in the twenty-first century.
Grammar: Passive voice, Causative HAVE, Conditional clauses (all the three types), Gerund vs. Infinitive, prepositions, Reported Speech with the introductory verb in the past (statements, questions, commands and prohibitions).
Business correspondence: dispatch, packing, transport.

Developing general and specific competence (knowledge and skills)

Broadening of vocabulary related to road transport, rail transport and postal services. Form and use of the passive voice, correct usage of Conditional Clauses, use of prepositions. Writing of various types of business letters: dispatch, packing, transport.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

THE GERMAN LANGUAGE III | **Course unit number: 21**

Hours weekly: 1+0+2+0 / III **ECTS credits: 3**

Syllabus outline

Topics for broadening of vocabulary relating to transport: Trading conditions, Road legislation, Early carriages, Evolution of the railway, The world of transport, Tecnology and relationship between transport and communications, Highway safety improvement, Technological development of the automobile, Public transport, Urban public transport, Technological advances in the twenty-first century.
Grammar: Passive voice, Conditional clauses (all the three types), subordinate clauses, Infinitive Clauses, prepositions,
Business correspondence: dispatch, packing, transport.

Developing general and specific competence (knowledge and skills)

Broadening of vocabulary related to road transport, rail transport and postal services. Form and use of the passive voice, correct usage of Conditional Clauses, use of prepositions. Writing of various types of business letters: dispatch, packing, transport.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

PLANNING AND MANAGING SUSTAINABLE TRANSPORT	**Course unit number: 59**
Hours weekly: 2+2+0+0/IV	**ECTS credits: 4**

Syllabus outline

Basic terms, definition and vision of sustainable development. Sustainable transport planning in the context of sustainable development. Interaction between town and transport development. Planning and managing town transport system with the aim od sustainable town development. Transport strategy development in towns. Sustinable mobility plans in towns. Managing transport in towns. Managing stationary transport in towns. Organization and the management of public passenger transport. Managing taxi transport. Including railway into public passenger transport. Ecological aspects of railway transport development. Long-distance passenger transport. Long-distance passenger transport terminals: bus, railway, maritime, air. Integrated land-maritime long-distance passenger terminals. Special transport categories: cycling and pedestrian transport. People with developmental disabilities and invalidity in transport. Programs and measures for creating higher quality transport in town. Planning transport in smaller urban areas. Integral public road passenger transport in low-population density areas. Socio-economic aspects of sustainable transport planning. Transport and pedestrian integration - shared street space. Ecological aspects of sustainable transport planning.

Developing general and specific competence (knowledge and skills)

Familiarizing with a developmental interaction problem of transport and town. Familiarizng with planning a town transport system. Differentiating ecological transport effects. Familiairizng with an organization and managing transport in towns. Familiarizing with programs and measures for creating town transport og higher quality. Familiarizing with transport-technical expertise. Mastering budget methods and its important exploitation elements. Familiarizing with criteria and choice techniques of transhipment means according to its purpose.

Methods of assessment

Sustainable Transport

GOODS-DISTRIBUTION CENTERS AND TERMINALS | **Course unit number: 23**

Hours weekly: 2+2+0+0 / IV **ECTS credits: 5**

Syllabus outline

Definition and classification of goods-distribution centers and terminals and their technical-technological features. Basic structure and function of goods-distribution centers and terminals and defining of their gravitational field: infrastructure, superstructure, transport means and equipment, personnel and information system and objects of labour. Methodology of defining contents and technical-technological features: containers, RO-RO, LASH, huckepack, road and rail terminals and terminals for bulk cargo, liquid cargo and special cargo. Methodology of assessment of static, dynamic and operative capacity of distribution centers and terminals. Planning and designing of distribution centers and terminals development. Planning and programming of management systems and calculation of economic results after the new plans.

Developing of general and specific competence (knowledge and skills)

Familiarizing with the basic features of particular distribution centers and terminals and their usage in the transport system. Designing of technological processes and work organization. Calculation of physical and financial indicators after planned technological designs.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

TRANSPORT LOGISTICS | **Course unit number: 20**

Hours weekly: 2+1+0+0 /IV **ECTS credits: 4**

Syllabus outline

Notion, contents, aim and principles of logistics. Logistics systems and processes. Position of distribution in logistics system. Orders and delivery of goods. Storage of goods. Management of supplies. Goods handling. Transport in logistics system: road transport, rail transport, maritime transport, other ways of transport in logistics system. Information system in service of logistics. Logistics organization and distribution in enterprises. Recent logistics and distribution strategies. Logistics operations in relation to transport and traffic. Transport logistics and sustainable development. Structure of goods in transport system. Interconnectedness of participants in transport and logistics systems.

Developing of general and specific competence (knowledge and skills)

Familiarizing with logistics system elements. Familiarizing with processes and logistics operations related to transport and traffic. Introduction to principles of business and transportation logistics. Mastering of advanced logistics conceptions and strategies. Speed, safety and economic management in transport.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

MANAGEMENT FUNDAMENTALS

Course unit number: 25

Hours weekly: 2+1+0+0 / IV

ECTS credits: 4

Syllabus outline

Definition and features of management. Systematic approach to management; Mutual relationship between management and entrepreneurship; Manager as a person and hierarchy of managers, manager's activity and his roles, managerial skills. Planning – nature and aim of planning, types of plans; SWOT analysis, Porter's model of generic strategies, BCG matrix; Hierarchy and types of strategies; Manager decision making. Organizing – notion and contents of organizing, shaping and types of organizing structures, classic and modern types of organization, advanced trends in organization shaping; culture of organization; conflicts in organization. Managing of human potentials – anticipation of needs, acquisition and selection, career managing, realization assessment and rewarding; Education and development; Salaries and compensation. Leading – definition, leader and leading skills, constitutive elements of leading, power and authority; Leading styles, approaches to leading; The theory of motivation, techniques of motivation. Control – notion and process of controlling; control stages, Control methods and techniques.

Developing of general and specific competence (knowledge and skills)

Developing of general competences dealing with enterprises' management and organizations. Capability of applying methods and techniques of management.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

OPERATIONAL RESEARCH IN TRANSPORT | **Course unit number: 18**

Hours weekly: 2+0+1+0/IV **ECTS credits: 4**

Syllabus outline

Term meaning, operational research history. Recent cases of OR successful implementation. Mathematical model. Linear programming. Linear programming problem mathematical model. Transforming real problems into mathematical model. Graphic problem solutions. Problem canonization. Determination of initial basic solution. Simplex method. Big-M method. Solution sensibility problem. Dual problem and economic interpretation of dual variables.
Definition of transport problems. Open and closed problems. Bringing open problems down to closed ones. The initial basic solution determining methods (the north-west angle method, the lowest price method, the Vogel method). The optimum solution determining methods (distribution method, modified distribution method). Transport model different modifications and restrictions (impermissible communications, communication limited capacity.

Developing of general and specific competence (knowledge and skills)

Acquiring theoretical knowledge and some basic OR method skills. Training for practical problem precise defining, transformations into mathematical model, model resolving by OR methods, and solution interpretation by sensibility analysis.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

URBAN PUBLIC TRANSPORT TECHNOLOGY AND ORGANIZATION | **Course unit number: 27**

Hours weekly: 2+1+0+0 / IV **ECTS credits: 4**

Syllabus outline

Public transport history and role in the town development. Public transport types. Public road transport: buses and trolley-buses. Parkings and stops. Public rail transport: tram cars, light rail vehicles, elevated express railroad, and regional railroad. Public transport means features and flow. Public transport advantages within the urban transport system. Public transport carrying capacity and organization. Transport timetable draw-up. Transport terminals and structures. Transport technology on terminals. Paratransit and alternative transport. Public transport special systems: cable railway, funiculars, cog railway, transporters and escalators. Public transport advanced systems: remote control cabin transport, single track railway, inclining train, magnet and air cushioned vehicles. Urban air and waterway public passenger transport.

Developing of general and specific competence (knowledge and skills)

Familiarization with problems concerning public and personal transports and possibilities for urban public transport organization. Identification of advantages, improvements, and needs for the urban public transport development. Presentation of public transport system selecting methods and organization.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

THE ENGLISH LANGUAGE IV | **Course unit number: 28**

Hours weekly: 1+0+2+0 / IV | **ECTS credits: 3**

Syllabus outline

Topics for broadening of vocabulary relating to transport: The history of the motor car, The modern car, The internal combustion engine, The diesel engine, The history of railways, The locomotive, Train control, Postal service in the USA, Flow of mail, Ten corridors for the 21st century, Delta 3 – major European project, and 3-4 specialized articles taken from various foreign transport magazines and newspapers
Grammar: relative clauses, purpose clauses, sequence of tenses, word building by prefixes and suffixes.
Business correspondence: writing of letters regarding payment – making payment, acknowledging payment, reminder, second notice, final notice, request for extension of credit, extending credit, refusing extension

Developing of general and specific competence (knowledge and skills)

Broadening of vocabulary related to road transport, rail transport and postal services. Correct usage ofrelative clauses and purpose clauses. Mastering the basis of word formation ba prefixes and suffixes. Writing of various types of business letters concerning payment.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

THE GERMAN LANGUAGE IV

Course unit number: 28

Hours weekly: 1+0+2+0 / IV

ECTS credits: 3

Syllabus outline

Topics for broadening of vocabulary relating to transport: The history of the motor car, The modern car, The internal combustion engine, The diesel engine, The history of railways, The locomotive, Train control, Postal service in Germany, Flow of mail.
Grammar: relative clauses, purpose clauses, sequence of tenses, word building by prefixes and suffixes.
Business correspondence: writing of letters regarding payment – making payment, acknowledging payment, reminder, second notice, final notice, request for extension of credit, extending credit, refusing extension

Developing of general and specific competence (knowledge and skills)

Broadening of vocabulary related to road transport, rail transport and postal services. Correct usage ofrelative clauses and purpose clauses. Mastering the basis of word formation ba prefixes and suffixes. Writing of various types of business letters concerning payment.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

ON-THE-JOB PROFESSIONAL SUMMER TRAINING | **Course unit number: 29**

Hours weekly: 0+0+0+(x) / IV **ECTS credits: 2**

Syllabus outline

One-month practical professional training is carried out during the summer season following the 2nd year of study.
Training contents is determined through students' special assignments. Students are required to make a professional presentation of their training course. Professional training is performed with transport companies, workshops and institutions.

Developing of general and specific competence (knowledge and skills)

Practical knowledge and skills acquired within companies or institutions.

Methods of assessment

Written presentation of professional training

ROAD TRANSPORT INFRASTRUCTURE

Course unit number: 30

Hours weekly: 2+1+0+0 / V

ECTS credits: 3

Syllabus outline

Introduction, basic terms, definitions, and terminology. Statutory regulations and institutions related with all-weather road design and construction. Road classification. Elements of horizontal and vertical road lines and their compatibility. Road cross section elements. Road-side structures and road equipment. Lower and upper road layers. Road surface construction types: flexible and rigid, multi-layered, the level crossroads layer and multi-level interchange quality and compactness control: construction elements, traffic related and technical and aesthetic criteria. Pedestrian zones and communications.

Developing of general and specific competence (knowledge and skills)

Familiarization with comparative performance techniques and research on an optimum model in terms of economic, technical, and aesthetic criteria.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

MEANS OF ROAD TRANSPORT AND THEIR EXPLOITATION | **Course unit number: 31**

Hours weekly: 2+0+2+0 / V **ECTS credits: 5**

Syllabus outline

Introduction. Classification of road transport vehicles. Basic characteristic of road vehicles. Driving mechanics. Friction limit. Load distribution on axes and wheels at rest and during movement along the straight road and in curves. Vehicle stability in curves. The influence of drive wheels on stability and driving safety. The influence of road profile on stability and driving safety. Determining of vehicle's center of gravity. Vehicle's assemblies (engine, clutch, gear-box, reduction gear, compensation mechanism and power distributor, shafts, links, pneumatics, braking system, steering system, signalization system).
Change of the vehicle technical condition during exploitation. Causes of technical condition change. Wearing. Influence of exploitation on vehicle lifetime. Maintenance conceptions. Maintenance processes and optimization. Logistic support. Diagnostics. Favors for road vehicle maintenance.

Developing of general and specific competence (knowledge and skills)

Introduction to various types, parts and assemblies of a vehicle, as well as to driving dynamics, driving conditions and their influence on safe driving. Introduction to changes concerning the reliability of a vehicle during exploitation and familiarizing with maintenance.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

ROAD TRANSPORT TECHNOLOGY AND ORGANIZATION | **Course unit number: 32**

Hours weekly: 2+2+0+0 / V **ECTS credits: 4**

Syllabus outline

Definition of road transport technology, particularly: road transport technology structure, features of cargo and passengers transport demands in interurban transport. Methods of classification of transport demands. Transport coefficient. Road transport structure: infrastructure, superstructure, means of transport, transport equipment and basic, classical and advanced technologies of road transport. Functions of road transport: choice methodology, distribution of cargo on the vehicle as a factor influencing burdening of tires and their wearing out as well as driving safety, rostering criteria, time analysis of means of transport and handling devices. Information system and road transport technology management system. Planning of development of road means of transport.

Developing general and specific competence (knowledge and skills)

Familiarizing with theoretical models and fields of their application , as well as with advantages and disadvantages of particular technological models in road transport. Designing of technological lists and work organization. Calculation of physical and financial indicators after designed models.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

ROAD TRANSPORT SAFETY WITH TRAFFIC ACCIDENTS EXPERTISE	**Course unit number: 33**
Hours weekly: 2+0+1+0/V	**ECTS credits: 4**

Syllabus outline

Introduction into transport safety problematics. Elements of a road transport safety system. Tackling the safety issue in the society. The state of road transport safety in the Republic of Croatia and EU. Safety factors in road transport: a human –driver, vehicle, road, environment, incidental factor. Driving elements. Starting, accelarating, slowing down and vehicle braking. A reaction and braking path. Stopping sight distance in front an unmovable obstruction, at intensive and free braking. A vehicle in transport. Safe distance.Bypassing, detouring and surpassing vehciles. A transport path. Road. Junction. Environment, Lighting. Standard and non-standard tranposrt signalization with the aim of transport safety. Definition and identification methodology of dangerous places on roads. Sanation program of dangerous places on roads in the Republic fo Croatia. Investigation elements at traffic accidents. Types of traces in traffic accidents. Velocity investigation of motor vehicles movement in traffic accidents. Investigation of general types of traffic accidents. Elements of conducting transport-technical expertise.

Developing general and specific competence (knowledge and skills)

Familiarizing a safety problem and safety factors. Emphasis on classical safety elements: human, vehicle, road and environment. Mastering the budget in relation to movement and stopping a vehcile. Familiarizing with standard and non-standard transport signalization with the aim of safety prevention. Defining and recognizing dangerous places on roads. Familiarizing with an investigation into traffic accidents. Familiarizing with transport-technical expertise.

Mastering budget methods of important exploitation elements. Familiarizing with criteria and choice techniques regarding means of transport according to its purpose.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

TRAFFIC ENGINEERING

Course unit number: 34

Hours weekly: 2+0+1+0 / V

ECTS credits: 4

Syllabus outline

Interrelation between supply and demand. Research and planning of transport. Interrelation between individual and public transport. Theory of the flow of transport. Traffic network. Classification of traffic routes and traffic on traffic routes. Capacity and levels of services. Traffic routes dimensioning. Conflicts of flows of transport. Intersections and nodal points. Traffic regulation principles. Intersections designing. Traffic simulation programs and programs of intersections capacity resolving. Standard traffic signalization. Dynamic signalization. Light signalization. Work plan of traffic lights in space and time. Coordination of traffic lights operation: both linear and network. Dynamic and nonstandard traffic signalization; traffic equipment. Parking. Work technology at parking lots. Car park buildings. Traffic technology in traffic buildings. Alternative traffic.

Developing general and specific competence (knowledge and skills)

Introduction to the problems of interrelation between traffic supply and demand, research and planning of transport. Identification of skills of flows of transport managing and possibilities of solving flow of transport conflict problems. Introduction to software for traffic movements and capacities calculation.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

INFORMATION SYSTEMS IN ROAD TRANSPORT

Course unit number: 35

Hours weekly: 1+0+2+0 / V

ECTS credits: 3

Syllabus outline

Notion of information systems in road transport and their features. Systematization of information systems components in road transport: assembly equipment and operation systems, communication equipment, developmental program tools, object technology, Internet and relation data bases. Designing and development of information systems. Computer supported methods of information systems development. Business reingeneering and supply chains management as basic methods of development of advanced information systems in road transport. Types of information systems in road transport. Information – booking systems in road transport. Systems for monitoring and management of flow of goods and vehicles in road transport (global systems for locating of vehicles by satellite, vehicles control – steering systems, signaling devices systems, robot systems). Computer simulations and road transport management.

Developing general and specific competence (knowledge and skills)

Familiarizing with the most important informatics terms and their meaning. Acquisition of knowledge regarding information system user and his importance in its particular development stages. Importance of relationship between business and information system relationship. Information systems differentiation.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

ROAD TRANSPORT ECONOMICS

Course unit number: 36

Hours weekly: 2+1+0+0 / V

ECTS credits: 4

Syllabus outline

Development of Croatian and European road transport network. Importance of the road transport. Economic peculiarities of transport. Trading companies in road transport. Production and features of transport services in road transport. Structure of expenses in road transport. Economic traits of road infrastructure and superstructure. Models of road transport network. Modern phenomena in road transport – safety, ecology, financial stability.

Developing general and specific competence (knowledge and skills)

Introduction to functioning and development of Croatian and European road transport network, assessment of justification of road infrastructure development , evaluation of modern phenomena in road transport.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

SEMESTRAL PRACTICAL PROFESSIONAL TRAINING | **Course unit number: 37**

Hours weekly: 0+0+0+(x) / VI | **ECTS credits: 13**

Syllabus outline

Practical professional training assignments follow the contents of particular professional studies. Particular professional study practical training assignments are defined by practical training supervisors. Practical professional training contents and dynamics are defined by practical training supervisors in agreement with mentors within a particular company.

Developing general and specific competence (knowledge and skills)

Acquiring practical knowledge and skills with companies or institutions.

Types of classes and methods of assessment

A 225-hour practical professional training is performed under supervisor's control.
For quality purposes special arrangements are made with appropriate organizations through nominated mentors securing successful practical trainings. Students are required to keep journals.

GRADUATION THESIS | **Course unit number: 38**

Hours weekly: 0+0+(x)+0 / VI **ECTS credits: 17**

Syllabus outline

Graduation thesis represents an independent work for assessment of student's professional knowledge required to evidence a certain level of skill in resolving independently a professional assignment. The content of graduation thesis is based on implementation of professional knowledge and skills acquired throughout the professional study. Themes are limited to certain professional courses only. Theme selection is to be made by students during semester VI of study. Topics are determined by mentors available for contacting throughout the thesis draw-up process. Thesis scope is determined within the 225-hour practical professional training.

Developing general and specific competence (knowledge and skills)

Training for resolving independently a problem assigned implementing professional knowledge acquired throughout the study. During the thesis draw-up process, students are directed by their mentors toward successful achievement of objectives determined.

Types of classes and methods of assessment

In agreement with their mentors, students select their graduation thesis themes to be elaborated following mentor's suggestions for presentation before a commission.

RAIL TRANSPORT INFRASTRUCTURE

Course unit number: 39

Hours weekly: 1+1+0+0 / V

ECTS credits: 3

Syllabus outline

General principles of railway route designing. Route constructive elements and railway route designing. Calculation of the track bed structure (Schram, Winkler, V.M.E., Zimmerman, Jeahn). Categorization of railways. Elements of the track bed structure. Rails (function and production). Sleepers (role and manufacture). Gauge ballast bed. Gauge equipment. Gauges. Switches. Crossings. Turntables and gearings. Track substructure elements. Building along the rail. Rail basic construction. Supporting and coating walls. Water drainage. Rail draining and protective ditches. Subbase layer.Slopes. Land-slides. Drainage. Culverts. Tunnels. Galleries. Bridges. Categorization f bridges. Railway stations (equipment; classification and types of railway stations and other official places where railway transport takes place). Rail protection – biological-technical protection, eco-protection. Protection structures (windbreaks, snowbreaks). Protection of environment against noise caused by trains. Biological protection.

Developing general and specific competence (knowledge and skills)

Introduction to railway designing, building and maintenance , as well as with its constructive elements. Introduction to development directions and possibilities. Familiarizing with advantages of railway transport over other types of transport.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

ROLLING STOCK AND TRAIN HAULING

Course unit number: 40

Hours weekly: 2+0+1+0 / V

ECTS credits: 4

Syllabus outline

Term meaning, types and classification of rolling stock. Hauling means. Diesel hauling means. Electrical hauling means. Means hauled. Passenger coaches. Term meaning and rolling stock brake type classification. Brake use basic conditions. Locomotive and wagon braking systems. Hauling means power. Drive resistance. Interdependence of hauling power and adhesion weight. Hauling passport. i-V chart. Q–V chart. Longitudinal rail profile simplification. Train braking system. Train moving equation. Train running chart. Power consumption computation. Rolling stock maintenance.

Developing general and specific competence (knowledge and skills)

Familiarization with rolling stock types, features, and assemblies. Acquiring skill in train hauling and braking computation methods. Familiarization with rolling stock exploitation and maintenance.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

RAIL TRANSPORT TECHNOLOGY AND ORGANIZATION

Course unit number: 41

Hours weekly: 3+2+0+0 / V

ECTS credits: 6

Syllabus outline

Transport technology as a science and business activity. Special transport technologies. Rail transport technology relevant features. Rail organization basic terms. Railway vehicles. Rail transport organization factors; stationary facilities, transport means, human resources.
Rail transport exploitation indicators: hauled and hauling means exploitation.
Planning and analysis assignments. Transport planning and analysis: transport plan, transport plan performance analysis.
Train transport graphic display: train transport chart.
Rail capacity computation. Rail technical capacity: carrying capacity, flowing capacity. Rail technical capacity exploitation computation, technical capacity upgrading. Timetable draw-up.

Developing general and specific competence (knowledge and skills)

Familiarization with rail transport technology. Familiarization with hauled and hauling means exploitation. Computation methods, rail capacities, rail flowing capacity, and carrying capacity computations.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

SIGNALLING AND AUTOMATION IN RAIL TRANSPORT | **Course unit number: 42**

Hours weekly: 2+0+1+0 / V | **ECTS credits: 4**

Syllabus outline

Rail transport signalling equipment. Signal types, light colours, optical systems, signal installation and adjustment. Points, points types and features, installation and fastening. Skids. Points heating. Rail and points check-ups, isolated sections. Rail contacts. Power facilities. Interdependence table. Railway station central control. Shunting yard facilities. Locomotive signalling. Automatic section block. Road crossing security. Rail telecommunications. Remote control. Automatic control. Digital control fundamentals.

Developing general and specific competence (knowledge and skills)

Familiarization with the make, purpose, advantages and shortcomings, and operation of particular signalling and safety equipment and components. Pointing to possibilities and necessities for implementation of most recent technologies in rail transport management.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

RAIL TRANSPORT SAFETY

Course unit number: 43

Hours weekly: 2+0+1+0 / V

ECTS credits: 4

Syllabus outline

Safety factors in rail transport. Railway station protection. Protection of the open railway section. Protection of road level crossings. Automatic stopping of trains. Automation and centralization of a control process. The role of human factor in rail transport safety. Emergency case. Consequences of emergency cases. Emergency causes. Dealing with emergencies. Measures to be taken in order to establish the safe flow of traffic after an emergency. Equipment used for clearing the consequences of an emergency. Inspection, investigation and reconstruction of the emergency.

Developing general and specific competence (knowledge and skills)

Perceiving the problems and the importance of rail transport safety. Introduction to technological and technical solutions which enable, i.e. increase the rail transport safety. Familiarizing with measures to be taken in case of emergency.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

INFORMATION SYSTEMS IN RAIL TRANSPORT

Course unit number: 44

Hours weekly: 1+0+2+0 / V

ECTS credits: 3

Syllabus outline

Notion and features of information systems in rail transport. Systematization of components of information systems in rail transport: assembly equipment and operating systems, communications equipment, CASE tools, object technology, Internet and web technology, Excel in quantitative analyses, relational data bases. Designing and development of information systems in rail transport. Stages and principles in the development of information systems. Business reengineering and management of supply chains as basic methods of development of advanced information systems in rail transport.
Types of advanced information systems in rail transport. Information – booking systems in rail transport. Systems for observing and managing the flow of goods and vehicles in rail transport.
Computer simulations and rail transport management.

Developing general and specific competence (knowledge and skills)

Mastering of the most important informatics terms and their meaning. Learning about information system user and his role in development of particular phases of information system. Perceiving of the importance of relationship between the business system and the information system. Diversity of information systems.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

RAIL TRANSPORT ECONOMICS

Course unit number: 45

Hours weekly: 2+1+0+0 / V

ECTS credits: 3

Syllabus outline

Development of Croatian and European railway network. The importance of railway traffic. Economic features of railway infrastructure and transport devices. Market structure in railway traffic. Production and features of transport services in railway traffic. Structure of expenses in railway traffic. Measurement of railway operators' successfulness in business operations. Modern phenomena in railway traffic – safety, energy, ecology, financial stability.

Developing general and specific competence (knowledge and skills)

Introduction to functioning and development of Croatian and European railway network, assessment of railway operators' successfulness in business operations, quantification of expenses in railway traffic, consideration of modern phenomena in railway traffic.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

POSTAL SERVICES INFRASTRUCTURE

Course unit number: 46

Hours weekly: 2+1+0+0 / V

ECTS credits: 3

Syllabus outline

Cable ducting. Cable ducting objectives. Cable wells. Traction force computation. Laying of air TC networks. Direct cable burying. Cable laying technology and protection. Technical regulation of postal service facilities design. Technical requirements for construction of postal service premises. Technical requirements for exchange areas. Technical requirements for relay areas. Technical requirements for power system areas.

Developing general and specific competence (knowledge and skills)

Familiarization with regulations concerning TC networks. Buried and level TC network registers and their updating. Public and dwelling structure design fundamentals.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

POSTAL SERVICES TECHNOLOGY AND ORGANIZATION | **Course unit number: 47**

Hours weekly: 3+1+0+0 / V **ECTS credits: 4**

Syllabus outline

Definition of technology and postal service technology specific features. Postal service history. Postal service and parcel classification. Letters and parcels transport technological phases. Parcel delivery technology and organization. Parcel dispatch technology. Postal transport. Parcel collection technology. Service and delivery technology. Postal charges. Express delivery technology and organization. Track & Trace & Identification (RFID) systems. E-mail technology. Advanced postal service technologies. Postal service activity stakeholders. Organization of the national postal service operator. International postal service organization and harmonization. Postal system information executive management processes. Central (regional) postal service organization. Post office network operational supervision and control.

Developing general and specific competence (knowledge and skills)

Familiarization with theoretical models and their respective implementation areas as well as particular technological model advantages and shortcomings in postal services.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

POSTAL PAYMENT SERVICES

Course unit number: 48

Hours weekly: 2+0+1+0 / V

ECTS credits: 4

Syllabus outline

Breakdown of postal payment services. Modalities of postal payment service fee payment and payment operations. National and international cash remittance organization and technology. Payment in and out operations. Postal savings service. Current account retail service. Postal exchange office. Contractual payment services. Cash-desk operations. Postal savings and banking operations. Informatical support and TC connecting. Advanced postal payment services.

Developing general and specific competence (knowledge and skills)

Familiarization with postal and payment service relevant elements and procedures and postal services in money transactions.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

POSTAL SERVICES INFORMATION SYSTEMS

Course unit number: 49

Hours weekly: 1+0+2+0 / V

ECTS credits: 3

Syllabus outline

Term meaning and postal service and communication information system features. Systematization of information system components: assembly equipment and operational systems, communication equipment, programme development tools, object technology, Internet and web technology, quantitative analysis table calculators, relation data bases.
Postal service information system design and development. Business engineering and supply chain management as postal service advanced information system basic development methods. Postal service advanced information systems. Postal service information and booking systems. Data, information, and message monitoring and management. Postal parcel automated sorting systems. Postal service and communication globalization and automation.

Developing general and specific competence (knowledge and skills)

Acquiring knowledge on most significant informatical terms and their meanings, on information system users and their importance for particular development phases. Learning the importance of relations between business system and information system. Information systems diversity.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

POSTAL SERVICES NETWORK PLANNING

Course unit number: 50

Hours weekly: 2+1+0+0 / V

ECTS credits: 5

Syllabus outline

Postal service area and traffic planning types. Postal service demand and turnover projection. Postal service network planning heuristic and systematic approaches. Transport matrix and parcel confluence. Postal service centre topological structuring and planning. Postal codes. Postal network optimization methods and models. Determinng transport capacity and parcel transport order. Post office optimization. Telematic network planning for payment operations. Postal operation telecommunication capacity planning. Emergency plans.

Developing general and specific competence (knowledge and skills)

Familiarization with postal network design and planning and postal service optimization possibilities.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

POSTAL SERVICES ECONOMICS

Course unit number: 51

Hours weekly: 2+1+0+0 / V

ECTS credits: 4

Syllabus outline

Development of Croatian and European postal services network. Importance of postal traffic. Economic peculiarities of postal traffic. Market structure in postal traffic. Production and features of services in postal transport. Structure of expenses in postal traffic. Measurement of postal operators' successfulness in business operations. Modern phenomena in postal traffic – financial stability, transforming of national postal operators into global logistic operators, influence of e-way of doing business on further development of postal traffic.

Developing general and specific competence (knowledge and skills)

Introduction to functioning and development of Croatian and European postal services network, assessment of postal operators' successfulness in business operations, quantification of expenses in postal traffic, consideration of modern phenomena in postal traffic.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

POSTAL SERVICES TECHNICAL FACILITIES

Course unit number: 52

Hours weekly: 1+0+2+0 / V

ECTS credits: 4

Syllabus outline

Postal system technical facilities breakdown analysis. Counter service equipment. Parcel sorting machinery and automation. Selection of postal transport means. Containers, pallets, and boxes. Payment transaction technical devices and means. Telecommunication and telematic postal equipment. Bar coding and scanning. Auto-identification technology (RFID etc.). OCR systems. Postal Intranet systems. Protection of persons and structures.

Developing general and specific competence (knowledge and skills)

Familiarization with postal service technical facilities, parcel sorting automation and mechanization possibilities, and parcel transport alternatives.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

HUMAN RESOURCES IN TRANSPORT

Course unit number: 57

Hours weekly: 2+1+0+0 / V

ECTS credits: 3

Syllabus outline

Theoretical features of economics, labor market and human resources. Organizational concept of human resources management in transport enterprises. Functions of human resources in transport enterprises. Information technologies – a factor in achieving high quality management over human resources in transport enterprises.

Developing general and specific competence (knowledge and skills)

Introduction to functioning of transport labor market, comprehension of specific qualities of management over human resources in transport, developing of a modern approach to human resources management process, mastering of functions of human resources in transport enterprises.

Methods of assessment

The course is carried out weekly, in the form of consultancy.

INTRODUCTION INTO METHODOLOGY OF PROFESSIONAL AND SCIENTIFIC PAPERS	**Course number unit: 61**
Hours weekly: 2+1+0+0/V	**ECTS credits: 3**

Syllabus outline

Introduction into scientific research (scientific methods, terminology and classification of scientific methods, scientific work and research). Technology of developing a scientific and professional paper (the difference between scientific and professional work, topic choice, plan and research methodology, stages and important features of developing scientific and professional work, tables, images, graphs and their application in scientific research). Scientific and professional publications. Classification and structure of scientific and professional papers; terminology and types of papers in tertiary-level education, scientific papers categorization. Basic terminology (footnote, quote, abbreviation, publication). Basic parts of a scientific papers (intoduction, research, research results, conclusion, summary, keywords, references or bibilography; other parts: acknowledgement, coauthors, foreword, abbreviations, list of images and illustrations, graphical and image appendices).Structuring parts of a paper (chapters), paragraphs (a topic and concept). Rticulating and witing a professional paper. Ethical research aspects, ethical codex, an authoriship question. Witing a seminar paper and a final thesis. Creating a working bibliography; choice, gathering and examining literature; an on-line database, on-line magazines, purposeful browsing the Internet. Libraries. Documenting sources (quoting, paraphrasing and a list of literature). Creating a working bibilography; choice, gathering and examining literature; an on-line database, on-line magazines, purposeful browsing of the Internet. Professional board. Text formattino. A linguistic-stylistic text analysis (orthographical, grammatical and stilisti-linguistic interventions; clarity; simplicity; ex pressing thoughts concisely). Administrative and scinetific functional styles of the Croatian standard language. Linguistic and orthographical norms of the Croatian standard language in written and oral expression.

Developing general and specific competence (knowledge and skills

Inform students on specific methodological questions that are in relation with final thesis development by taking into consideration concrete examples of previous theses. The course develops the ability to write scientific and professional papers by introducing basic terminology in developing paper methodology; planning; phases of creating and basic procedures in its creation. The purpose of the course is to increase the level of literacy and students' ligusitic competence, which is not necessary only in writing a final thesis, but in developing presentations, but also in terms of their lifelong education and a critical approach to a text, among others , a critiacal approach to your own text.

Methods of assessment

The course is carried out weekly, in the form of consultancy.