

RTU Course "Traction Drives of Electrical Transport"

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General data

Code	EEP346
Course title	Traction Drives of Electrical Transport
Course status in the programme	Courses of Free Choice
Responsible instructor	Leonīds Ribickis
Academic staff	Ivars Raņķis
Volume of the course: parts and credits points	1 part, 3.0 credits
Language of instruction	LV, EN
Annotation	Mechanics of the electrical traction drives. Types of electrical motors applied and its characteristics. Speed regulation of the DC electrical motors. Pulse regulation. Braking processes. Problems of the magnetic field weakening. Formation of the transient processes. Induction mode traction motors, characteristics, and specifics. Regulation of speed, frequency converters and inverters. Braking regimes. Formation of the transient processes. Special action regimes of traction drives, skidding regimes. Automation of electrical drives, elements of the systems.
Goals and objectives of the course in terms of competences and skills	Main target is to acquaint students with the general knowledges of application of electrical drives, electrical machines, power electronics in electrical transport national economy systems. Student must be able apply predominatory knowledges for simplified calculation of motion, electromechanical and energetic characteristics of electrical transport.
Structure and tasks of independent studies	Is anticipated elaboration of the 3 individualized home works - calculation of characteristics of DC series excitation electrical motor; calculation of energetic characteristics of AC network DC drive with controlled rectifiers; calculation of motion process with AC induction motor electrical drive. For approval of results of calculations must be applied computer simulation programm Virtuallab2.0. Elaboration of home works is term for succesful passing of test lesson.
Recommended literature	Ribickis L., Raņķis I. Electrical Drives. Static characteristics and methods of speed control . Rīga: RTU. 1996. 107.p. Ribickis L., Valeinis J. Elektriskā piedziņa mehatronikas sistēmās. - Rīga:RTU, 2008. - 286 lpp. Transporta elektriskās mašīnas/ J.Dirba, K.Ketners, N.Levins, V.Pugačevs. Rīga: Jumava,2002, 344 lpp.
Course prerequisites	Knowledges in electrical drives, electrical machines, power electronics

Course contents

Content	Full- and part-time intramural studies		Part time extramural studies	
	Contact Hours	Indep. work	Contact Hours	Indep. work
Types of an electrical transport and its drives	2	0	0	0
Traction supply sources and its connections with electrical motors	4	0	0	0
DC contact network DC electrical motors modern drives	4	0	0	0
DC pulse regulators and its characteristics in the DC-DC electrical drives	4	0	0	0
Calculation of motion and energetic processes in the pulse regulation systems	4	0	0	0
Realization of DC drives from AC contact network	4	0	0	0
Application of induction motors in electrical transport	2	0	0	0
Aspects of speed regulation in induction motors electrical drives	4	0	0	0
Elaboration of vector and direct torque control systems for AC drives of an electrical transport	4	0	0	0
Total:	32	0	0	0

Learning outcomes and assessment

Learning outcomes	Assessment methods
To be able classify electrical transport traction drives in respect to properties of power supply and electrical motors	Successful passing of test negotiations
To be able explain a motion regimes, apply equations for calculation of motion processes as also energetic connections	Qualitative elaboration of the anticipated 3 home works for admittance of the test lesson and succesful passing of test negotiations

Study subject structure

Part	CP	Hours			Tests			Tests (free choice)		
		Lectures	Practical	Lab.	Test	Exam	Work	Test	Exam	Work
1.	3.0	2.0	0.0	0.0	*					