

E – Charakteristika studijního předmětu/Subject Specification				
Název studijního předmětu / Subject title	Electrical Transducers of Physical Quantities Elektrické převodníky fyzikálních veličin			
Typ předmětu / Subject type	Optional subject		dopor. ročník / semester/ recommended year / semester	1/2
Rozsah studijního předmětu / Study load in hours and credits	14	hod. za týden / weekly load	2+2	Kreditů / Credits 5
Jiný způsob vyjádření rozsahu / Other expression of study load	14 weeks, each 2 hours of lectures and 2 hours of seminary			
Způsob zakončení / Assessment	Exam		Forma výuky / Form of teaching	Lecturers and labs
Další požadavky na studenta / Other demands on students				
Vyučující / Lecturer	Prof. Ing. Jaroslav Nosek, CSc. , and Doc. Ing. Pavel Mokřý, Ph.D.			
Stručná anotace předmětu / Subject annotation	<p>Electrical transducers of physical quantities play an essential role in all high-tech electronic systems. In this subject, there will be given the both theoretical overview and practical experience in the area of selected electric transducers of physical quantities. An accent will be put on the application of piezoelectric and ferroelectric material in such systems. Lectures will cover following topics: (a) smart materials and their fabrication, (b) piezoelectric wide band (aperiodic) and resonant transducers, (c) piezoelectric resonators and their applications, (d) piezoresistive transducers, (e) smart sensors and actuators, and (f) an overview of modern trends in the design of electrical transducers based on the application of ferroelectric thin films including processing of microelectromechanical systems (MEMS).</p> <p>Student will acquire the basic concepts of the application of piezoelectric and ferroelectric materials in electrical transducers, including the practical experience from demonstrations of real experimental systems. The acquired theoretical and practical skills will be useful in the design of complex mechatronic systems that contains such elements.</p>			
Informace ke kombinované nebo distanční formě / Information for students in external form of study				
Rozsah konzultací (soustředění) / Consultations, study meetings		hodin za týden / hours per week		
Rozsah a obsahové zaměření individuálních prací studentů a způsob kontroly / Individual student work – type, load, content and way of checking				
Studijní literatura a studijní pomůcky / Reading list and study utilities				
[1] J. F. Nye: Physical Properties of Crystals (Oxford University Press, 1957) [2] M.E. Lines, A.M. Glass: Principles and Applications of Ferroelectrics and Related Materials (Clarendon Press, 1979) [3] K. Uchino: Ferroelectric Devices (Marcel Dekker, Inc., New York-Basel, 2000) [4] N. Setter: Piezoelectric Materials in Devices (EPFL, 2002) [5] T. T. Wang, J. M. Herbert, A. M. Glass, Ed.: The Applications of Ferroelectric Polymers (Blackie, London, 1988) [6] J. Zelenka: Piezoelectric Resonators and Their Applications (Elsevier Science Ltd., 1986)				