Title:	Energy Harvesting Systems and Practical Applications
Short Code:	EVA_EHA
ECTS Credits:	2
UAS:	ZHAW
Organizer Details:	MRU InES
Evaluation:	Oral exam at end of module
Decision Date:	25 January 2021
Start Date:	22 February 2021
End Date:	9 April 2021
Date Details:	
Type:	Seminar / Workshop
Language(s):	English by default, but deviations according to the wishes of the students.
Description (max. 300 characters):	Our research and this module focus on the practical application of energy harvesting. On the basis of concrete examples, energy harvesting is explained and the possibilities and restrictions are shown. Solutions and concepts for real applications are elaborated.

Contents and Learning Objectives:	Today, energy harvesting enables the operation of electronics without external power supply or batteries. Energy self-sufficient systems collect the energy required for operation from the environment. The development of the last few years makes it possible to operate sensors and actuators completely without batteries or external power supply. In this module, students learn how energy harvesting can be successfully applied in practice and where the limits are.
	
	Contents:
	
	• Energy Harvesting basics, methods and functional blocks (Energy Harvesting, converters, management, storage, processor, sensors, communication)
	• Real world application examples from actual research work: Industrial sensors, home automation, energy harvesting powered actuators
	• Requirements and restrictions developing energy harvesting for real applications
	• Exercises based on practical problems
	  ○ Application analysis
	  ○ Harvesting energy from different sources
	  ○ Conception of energy harvesting powered embedded systems

	○ Energy balance Learning Objectives: • Students can describe energy harvesting methods and know the functional blocks of energy harvesting embedded systems. • Students can explain requirements and restrictions for energy harvesting and are able to estimate the feasibility for practical applications. • Students are able to analyze applications in terms of energy harvesting feasibility and available energy sources. They can calculate an energy balance. • Students can conceptualize an energy harvesting embedded system for practical applications.
Admission:	ET / ST
Literature:	Literature list will be provided
Conditions:	50% theory / discussion, 50% labs / work in teams
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Status:	registration open
Specialization:	Computer Science (CS) Electrical Engineering (ElE) Mechatronics & Automation (MA)