UNIVERSITY of DEBRECEN

PEKÁR IMRE
DOCTORAL SCHOOL OF MECHANICAL ENGINEERING
H-4002 Debrecen, Ótemető str. 2-4.
e-mail: doktori@eng.unideb.hu
website: engphd.unideb.hu

Name of the course:	**Electronics and electronic energy converters**
Course type:	Optional
Responsible lecturer:	Dr. Tamás Péter Szemes
Content:	The aim of the subject is to further strengthen the approach developed in the undergraduate course and to present additional modelling methods, technology and application possibilities from the topic of modern electronic energy converters. The competence of the subject is based on the knowledge of mathematics, electrical engineering, electronics and the theory of electrical machines learned in the basic education, in cooperation with other compulsory subjects announced in the doctoral school, such as, but not limited to: Electrical Science, EMC Theory and Practice, Mechatronics and Physics of Electrical Machines. The purpose of the subject is to provide the student with (1) renewable energy production, (2) electricity distribution and control, and (3) electric drives; equips it with knowledge of theoretical modelling and simulation tools necessary for its planning, operation and operation. As a foundation, it introduces the students to (1) the dynamic description that can handle discontinuous functions necessary for modelling electronic energy converters operated in switching mode; (2) with the modelling description of electronic devices, which takes into account the physical design, manufacturing technology and environmental impact of the component; (3) provides system theoretical foundations for modelling the complex operating environment typical of non-linear systems. The student is evaluated during the execution of a complex project, where element-level, component-level, and system-level operational stability modelling must be performed in case of changing production and consumption scenarios. When the students fulfil the requirements of the subject, they get access to the NI software and hardware tools used in the Department of Mechatronics, with which they can realize distributed modelling and simulations running on multiple threads.
Literature:	• U. Tietze, Ch Schenk, "Electronics Circuits, Handbook for Design and Application", ISBN: 978-3-540-78655 • Muhammad H. ed. " Power Electronics Handbook " 4th Ed. ISBN: 9780128114087 • Publications of leading researchers and organizations related to the topic. For example, but not limited to: • Prof.dr.ir Pavol Bauer, TU Delft. • https://www.tudelft.nl/en/staff/p.bauer/?cHash=96dc8f6d55c5ea75995f7e9d5b68a50d • PEMC: Power Electronics and Motion Control Council • https://www.ecpe.org/