UNIVERSITY of DEBRECEN

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Name of the course:	**EMC Theory and Practice**
Course type:	Optional
Responsible lecturer:	Dr. István Balajti
Content:	The subject matter aims to take the approach, methods, and mathematics introduced in the undergraduate courses and increase them to the next level. It is adding a mathematical toolkit with the help of which the mechatronics engineering subsystems, mechanical, electrical, and information technology control parts with scientific needs, uniformly become modellable. It presents the origin and the principle of sensor devices operation such as radar, electromagnetic interference or smog, electromagnetic compatibility processes introduce their related quantitative and qualitative physical measures, with the standards in force application expectations. Examines the applicability of the Central Limit Theorem, the multidimensional covariance and correlation coefficient matrixes, the fast Fourier/Hartley transformation, the expediency of using the Kalman filter, extended Kalman filter, Particle filter, Bessel, and "nonparametric decision" functions. The methods of analysis that apply a uniform approach to the systems of equations of the sensor device descriptions are illustrated. It deals with some state-of-the-art procedures for analysing and synthesizing the functioning of complex systems with its scholarly question.
Literature:	• Illyes, Kornel; Kiss, Eszter; Novak, Adam; Skublics, Imre; Balajti, Istvan: Optimizing microstrip antennas and antenna arrays using evolutionary algorithms In: IEEE (szerk.) 2022 IEEE 20th International Power Electronics and Motion Control Conference (PEMC) [s.l.], Nemzetközi: IEEE (2022) pp. 530-535., 6 p. • Masuk, Abdullah; Istvan, Balajti: Mechatronics Engineering Aspects of VHF band Antenna Design of Industry 4.0 Applications In: IEEE, Computer Society (szerk.) 23rd Proceedings International Radar Symposium, Gdansk, Lengyelország: Warsaw University of Technology (2022) pp. 88-93., 6 p. • István, Balajti: Overview of the International Radar Symposium Best Papers, 2019, Ulm, Germany, REPÜLÉSTUDOMÁNYI KÖZLEMÉNYEK 31: 3 pp. 31-63., 33 p. (2019) • Péter Korondi: Mechatronics, Description of integrated mechanical and electrical systems in a control theory approach (manuscript)