

FACULTY:	Institute of Technology and Education
FIELD OF STUDY:	Materials Science and Engineering
COURSE TITLE:	Vacuum and plasma technique
LECTURER'S NAME:	dr hab. Kazimierz Reszka, University Professor
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ECTS POINTS FOR THE COURSE:	4
ACADEMIC YEAR:	2014/2015
SEMESTER: (W – winter, S – summer)	W/S
HOURS IN SEMESTER:	30+15=45
LEVEL OF THE COURSE: (1 st cycle, 2 nd cycle, 3 rd cycle)	1 st cycle
TEACHING METHOD: (lecture, laboratory, group tutorials, seminar, other-what type?)	Lectures (30h), Exercises (15h)
LANGUAGE OF INSTRUCTION:	English
ASSESSMENT METOD: (written exam, oral exam, class test, written reports, project work, presentation, continuous assessment, other – what type?)	Written exam, class test
COURSE CONTENT:	The course covers the following topics: Gas laws and models, viscous, intermediate and molecular states. Criterion of classification the vacuum; static and dynamic. The vacuum reinforcement and conductance values of flow. Classification of vacuum pumps on the operating principle base. Criterion of choice the vacuum pumps to mating. The vacuum measurement, monitoring, control and regulation. Analysis of gas using mass spectrometers. Types of leaks and their detection. Pressure ranges of industrial vacuum processes. Principles of ionization diluted gases. Methods of electron/ion beam making and application in materials investigations and vacuum technologies. The states of gas discharge at DC and RF potential and their properties. Comparison of thermal conductivity of monomolecular gases and mixtures at pressures close to molecular state. Calculation of specific surface area. Calculation of gas flow rate by vacuum reinforcement in viscous, intermediate and molecular states. Design of vacuum system for static and dynamic vacuum. Estimation of leaks on the basis of pressure drop and on the basis of subs bulb.
ADDITIONAL INFORMATION:	Required knowledge: fundamental laws of molecular and gaseous physics
RECOMMENDED LITERATURE	1.G.L.Weissler, R.W. Carlson, Vacuum Physics and Technology, Acad. Press, NY (1979) 2.W.Umvat, Fundamentals of Vacuum Technology, Lectures of Leybold, Kat-Nr199 90, 2007 (https://www.3.nd.edu/nsl/Lectures/urls/Leybold.FUNDAMENTALS.pdf) 3.J.F.O'Hanlon, A Users Guide of Vacuum Technology, John Wiley and Sons (198) 4.R.V.Stuart, Vacuum Technology, Thin Films and Sputtering, Acad.Press INC (1983) 5.R.L.Boxman, D.M.Sanders, P.J.Martin, Handbook of Vacuum ARC Science and Technology, William Andrew INC (1996) ISBN 978-0-8155-1375-9